## Methods Research Report

## Empirical Assessment of Within-Arm Correlation Imputation in Trials of Continuous Outcomes

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## Methods Research Report

# Empirical Assessment of Within-Arm Correlation Imputation in Trials of Continuous Outcomes 

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## Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new health care technologies and strategies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

To improve the scientific rigor of these evidence reports, AHRQ supports empiric research by the EPCs to help understand or improve complex methodologic issues in systematic reviews. These methods research projects are intended to contribute to the research base in and be used to improve the science of systematic reviews. They are not intended to be guidance to the EPC program, although may be considered by EPCs along with other scientific research when determining EPC program methods guidance.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the health care system as a whole by providing important information to help improve health care quality. The reports undergo peer review prior to their release as a final report.

We welcome comments on this Methods Research Project. They may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850, or by email to epc@ahrq.hhs.gov.

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## Empirical Assessment of Within-Arm Correlation Imputation in Trials of Continuous Outcomes

## Structured Abstract

Objectives: To better understand how to impute within-arm correlation for meta-analyses of continuous outcomes when data are missing, this study describes the range of correlation values in a representative set of studies with sufficient data reported, and simulates the effect of using different correlation values on meta-analysis summary estimates when imputing missing data.

Background: It is common that studies do not report sufficient data to allow meta-analysis of continuous outcomes. The standard error (SE) of the within-group differences is often not reported and cannot be calculated because the within-group correlation is unknown. For meta-analysis of net-changes, one must thus estimate the SE based on an arbitrarily chosen correlation.

Methods: From articles available to us from previous systematic reviews and from trials registered at ClinicalTrials.gov, we selected those that prospectively compared two or more interventions for continuous outcomes and reported all three of: baseline means and SEs (or equivalent), final means and SEs, and within-group changes and SEs. From these data we backcalculated correlation values for each study group. We described these data and tested for patterns based on study characteristics. We assessed the bias on estimates of within-group change SEs by comparing reported SEs with imputed SEs using arbitrarily chosen correlation values. We simulated meta-analyses, assessing the bias, coverage, and accuracy of the summary estimates derived from studies with missing correlation data.

Results: We analyzed 811 within-group correlation values from 123 studies with 281 study groups. The median (interquartile range) within-group correlation values across all studies was $0.59(0.40,0.81)$. Active treatment groups had lower correlation values (median 0.54) than no treatment groups (median $0.73, \mathrm{P}<0.001$ ). There was heterogeneity of correlation values across both outcome types and clinical domains. There was no apparent association with followup duration, but correlation values were lower with increasing sample size among no treatment groups. In the empiric dataset, imputing low correlation values ( 0 or 0.25 ) yielded an overestimation of the within-group SE in more than 85 percent of cases; imputing a correlation of 0.5 yielded values closer to those actually reported. Imputation had similar effects on the netchange SE. Simulation studies informed by the empirical results, demonstrated that imputation of values does not introduce bias in the meta-analysis estimate. Imputing values higher than the true correlation resulted in coverage probabilities that were lower than those in analyses using the complete data. However, coverage probabilities were generally lower than nominal ( $<0.95$ even with complete data) in the presence of moderate to substantial between study heterogeneity, despite using random effects models (DerSimonian-Laird).

Conclusions: Negative within-group correlation values are very uncommon in clinical studies. Imputing values in meta-analyses where some or all within-group correlation estimates are not reported does not introduce bias in the summary estimate of the treatment effect. However, imputation can affect the SE of the summary estimate when the imputed value is different from
the "true." In such cases, sensitivity analyses using alternative imputation values, possibly informed by studies reporting relevant information, are recommended.

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## Introduction

When conducting meta-analyses of continuous outcomes (for example, fasting blood glucose, systolic blood pressure) in randomized clinical trials (RCTs) it is common that studies do not report sufficiently complete data. For most meta-analyses of parallel design trials, the parameter of interest is the between-group difference in the change of the continuous outcome; namely the "net difference" between the change in outcome in the intervention group (A) minus the change in the control group $(\mathrm{B}): \Delta$ NetChange $=\left(\right.$ change $\left._{A}\right)-\left(\right.$ change $\left._{B}\right)$, or equivalently

```
NetChange = (Final }-\mp@subsup{\mathrm{ Baseline }}{A}{})-(\mp@subsup{\mathrm{ Final }}{B}{}-\mp@subsup{\mathrm{ Baseline }}{B}{})
```

For inverse-variance meta-analysis of such trials, the net change and the variance (or standard error [SE]) of the net change are needed from each trial. ${ }^{1}$ In general, the net change is readily available or can be easily calculated from published trial reports. It is common, though, that studies do not report the SE of the net change (or appropriate statistics that can be used to calculate it, such as the standard deviation of the net change, its confidence interval, or the exact P value comparing baseline and post-treatment values). If a study reports the SEs for the change from baseline in both the intervention and control groups, then it is possible to accurately calculate the SE of the net change: $S E_{\text {NetChange }}=\sqrt{S E_{A}{ }^{2}+S E_{B}{ }^{2}}$, where $S E_{A}$ and $S E_{B}$ are the SE of the change in the outcome for each trial group.

However, many studies do not report SE data for the within-group changes. Instead, they commonly report the SE (or standard deviation) for both the baseline and the final values within each group. In such cases, for meta-analysis, one must estimate the SE of the within-group changes. Because the baseline and final values are calculated on the same patients they are correlated and the SE of the within group change in each group is given by the formula: $S E_{\text {change within-arm }}=\sqrt{S E_{\text {Final }}^{2}+S E_{\text {Baseline }}^{2}-2 \times r \times S E_{\text {Final }} \times S E_{\text {Baseline }}}$, where $r$ is the correlation between baseline and final values. All correlations nominally take values between -1 and 1 . If $r$ is positive, within the context of a given study, participants with high baseline values tend to have high final values relative to other participants (and vice versa). If $r=0$, baseline and final values are independent of each other. If $r$ is negative, participants with high baseline values tend to have low final values (and vice versa). The closer $r$ is to 1 (or -1 ), the stronger the prediction of final values from the baseline values. Negative within-group correlations are likely to be uncommon, so that, in the majority of studies reporting baseline and final measurements, one expects the correlations to be positive. ${ }^{\text {a }}$

Thus, in the common scenario where the SE of within-group changes (or its equivalent) is not reported (and not available from the study authors), the meta-analyst must make a best guess (or a series of guesses) at the value of $r$ to calculate the net-change SE for the study. Other options for the meta-analyst, which are not further discussed, include excluding the study from the metaanalysis or using an SE that is based on the standard deviations of other studies included in the meta-analysis-or from other sources of studies (e.g., the median or largest standard deviation among included studies). Many authors use the arbitrarily chosen value of $r=0.5$, presumably because it is half way between 0 and 1 . An empirical assessment of meta-analytic practices described large variation in handling missing variance data in systematic reviews. Among 101 systematic reviews in an empiric assessment by Wiebe et al., ${ }^{2} 29$ imputed within-arm

[^0]correlations. Approaches included imputing a correlation value of 0.5 , a value of 0 , using a value from another included study (the most common approach), performing a sensitivity analysis using at least two values, or imputing an unstated value.

Clearly, there is little evidence to recommend a specific approach for meta-analysis of netchanges when some of the within-group correlations are missing. Therefore, we set out to better understand the distribution of true values of $r$ across published trials, to assess if there are any associations between characteristics of the trials and the value of $r$, and how using different values of $r$ in meta-analyses might affect summary estimates.

## Study Aims

1. In a representative sample of trials, describe the range of correlation values, $r$.
2. In a representative sample of trials, compare values of the net-change SEs derived from reported within-group SEs with the net-change SEs derived from estimating the correlation values, $r$.
3. By simulation, explore the impact of imputing a range of correlation values, $r$, on fixed and random effects model meta-analyses.

## Methods

## Source of Studies

We collected continuous outcome data from a convenience sample of RCTs from three large sets of published and unpublished studies. Our initial goal was to identify at least 100 comparative studies with sufficient data (see third bullet under Study Eligibility below). The first source included all primary studies (studies with reported data) we had available as full-text articles stored on our Evidence-based Practice Center's (EPC) network (studies on a wide range of domains including, but not limited to, cardiology, dentistry, gastrointestinal disease, maternal health, nutrition, oncology, pediatrics, pharmacogenetics, pulmonology, and surgery). The second source included all full-text primary studies stored on the network of the Evidence Review Team for the evidence-based clinical practice guideline organization Kidney Disease: Improving Global Outcomes (KDIGO); these included studies retrieved for 19 guidelines and several other topics. The third source was the ClinicalTrials.gov database. With the assistance of our colleagues at the National Library of Medicine, we compiled a list of 1,433 records of trials with published results as of October 2011.

## Study Eligibility

The full-text (or spreadsheet from ClinicalTrials.gov) of each study was screened with the following eligibility criteria:

- Randomized or nonrandomized prospective comparative studies of parallel or crossover design (with two or more study groups [arms]); crossover studies had to report eligible data for the baseline and final timepoints in the first phase of the crossover (i.e., the parallel group phase prior to crossover)
- One or more continuous outcomes reported
- Sufficient data to back-calculate the correlation value, $r$, in each study group, including all three sets of items here:
- Mean baseline estimate and a measure of its variation (SE, standard deviation, or defined confidence interval)
- Mean final estimate and a measure of its variation (SE, standard deviation, or defined confidence interval)
- Within-group change (final minus baseline) and a measure of its variation (SE, standard deviation, or defined confidence interval)
- All data had to be reported with the same metrics; in particular we excluded studies that reported only baseline values and percent changes from baseline values
- All data had to be reported in text format (i.e., we did not estimate data from figures)
- In addition,

[^1]majority of potentially eligible studies (based on P value) had highly statistically significant within-group differences and thus their inclusion might lead to a biased selection of studies.
o We excluded within-group or between-group differences that were adjusted for baseline covariates.
Of note, we included studies of any population, intervention, comparator, or (continuous) outcome.

## Data Extraction

From each study we extracted the following data:

- Study identifier information (including PubMed identifiers for associated studies reported in ClinicalTrials.gov)
- Medical domain of the study and a brief summary of the eligibility criteria
- Study design (RCT, prospective nonrandomized comparative study)
- Followup duration
o When outcomes were reported at multiple followup timepoints, we extracted data from the last timepoint when $>80$ percent of the baseline sample size were included; if no timepoint met this criterion we used the timepoint with the largest sample size
- Names of interventions, including comparator, for up to three interventions
o If there were more than three interventions (study groups), we included the comparator intervention (e.g., placebo, usual care) and the first two other interventions listed
- Names and units of up to five continuous outcomes
o If there were more than five continuous outcomes reported, we randomly selected five outcomes (using Excel's random number generator); however, we tried to avoid extracting outcomes that were derivative of other included outcomes (e.g., mean arterial blood pressure and systolic and diastolic blood pressures)
- For each outcome-intervention pair we extracted
o Baseline, final, and difference sample sizes
- If final and difference sample sizes were not reported, we assumed they were the same as the baseline sample size
- If difference sample size was not reported, we assumed it was the same as the final sample size
o Baseline, final, and difference reported mean values
o Baseline, final, and difference reported variation (either SE, standard deviation, or confidence interval, but not P value)
Of note, for articles that reported multiple trials, we extracted each trial separately.
Each study was extracted by one researcher (EB, AE, KP). The extractors included the lead investigator who has more than 10 years of experience with data extraction and two research associates with 3 and 7 years, respectively, of experience with data extraction. After all extractions were complete, each extraction was reviewed and corrected by a second researcher. The lead investigator extracted or reviewed a large majority of the eligible studies. Studies or outcomes that did not meet eligibility criteria were deleted. The PubMed identification numbers were compared and duplicate studies were consolidated.

For each intervention-outcome pair, we calculated the value of $r$ based on the reported data.

## Data Analyses

## Aim 1. Empirical Assessment

We first excluded study groups where the estimated (back-calculated) correlation coefficient between baseline and final values was outside the interval [-1, 1]; such estimates of the correlation coefficient are not valid ${ }^{b}$ and occur because of rounding of values reported (or errors) in published papers. We used our best judgment to categorize outcome types as a device measures (e.g., tonometry), laboratory values, signs (e.g., visual acuity), symptoms (e.g., pain), questionnaire or equivalent scores, or "other." Of note, blood pressure (clinic, home, or ambulatory) was categorized as a device measure. Similarly, we classified studies into clinical domains based on a combination of the study eligibility criteria and the goal of treatment; studies could be classified with multiple clinical domains (e.g., kidney disease and cardiovascular disease). We also categorized interventions (study groups) as either active or no treatment (including placebo and usual care).

We calculated basic summary statistics for the range of calculated $r$ values. We drew scatterplots with locally weighted smoothing lines (LOWESS), histograms, and boxplots of the $r$ values against different study or outcome characteristics, and sample size. Associations between $r$ values and continuous study characteristics (e.g., study duration) were expressed as Spearman correlation coefficients; comparisons of correlation values across categorical characteristics (e.g., active treatment versus no treatment) were analyzed with the Kruskall-Wallis test.

To assess what study or group characteristics affect the within-group correlation we used a mixed effects linear model with the Fisher z-transformed ${ }^{\text {c }}$ correlation coefficient as the outcome of interest and the following predictors: duration of followup (square root transformed to improve visualization of short-duration followup), type of intervention (active treatment or no treatment), group sample size (ln-transformed), outcomes measured, and clinical domain (for analysis in the model, we used our judgment to choose the dominant clinical domain for the four studies assigned multiple clinical domains). This model accounted for the clustering of study groups within studies using a random intercept by study. We used the same model to test if there was an interaction between study duration or baseline sample size and type of treatment on the reported correlation by including appropriate cross-product terms (study duration $\times$ type of treatment, or baseline sample size $\times$ type of treatment, respectively).

All analyses were performed in Stata version IC/12.1 (Stata Corp., College Station, TX). Statistical significance was defined as a two-sided P -value $<0.05$ for all comparisons. No adjustments for multiple comparisons were performed.

## Aim 2. Impact of Imputing Alternative Correlation Values in the Empirical Dataset

To assess the effect of imputing correlation values on the empirical dataset, we recalculated the study-specific SEs of the within-group change for each study group using alternative imputed values ( $\rho=0,0.25,0.50$, and 0.75 ). The tested imputed values are commonly used in sensitivity analyses of studies included in meta-analyses that do not report the within-group correlation

[^2]value. We graphically compared SEs calculated using imputed values against SEs calculated using the complete (true) data by constructing pairwise scatterplots.

To analyze the effect of imputing various correlation values on the SEs of net changes (the study estimates most likely to be used in meta-analyses), for each study we also paired the comparator group with an arbitrarily selected active intervention (if there was no obvious comparator, we arbitrarily selected two interventions). These data were analyzed in the same manner as within-group correlation values.

## Aim 3. Imputing Correlation Values on Fixed and Random Effects Model Meta-Analyses

To explore the analytical performance of imputing within-group correlation values when some or all studies in a meta-analysis do not report the necessary estimates, we performed a series of simulation studies. Details about the simulation methods and parameter values are presented in Appendix A. Briefly, we simulated meta-analyses (each including 5, 10, or 20 studies, all of which had the same sample size) of parallel-group design trials with two treatment groups and a continuous outcome, measured at baseline and followup. For parsimony, we assumed that the study groups were independent, all patients remained in their treatment assignment group (intention-to-treat), and they had complete followup. Table 1 summarizes the parameter values used in simulations. We evaluated different control group sample sizes and different randomization ratios (sample size ratios between the treated and control group of 1:1 or 2:1). Values for the baseline and followup outcome values were drawn from bivariate normal distributions. The within-group correlation was assumed to be the same for both groups; we assessed correlation values equal to the $25^{\text {th }}, 50^{\text {th }}$, and $75^{\text {th }}$ percentile of the distribution of correlation values obtained in the empirical component of this study (Aim 1), along with the special case of no correlation $(r=0)$. The mean of the baseline values of treated and control groups and the followup values of the control group were assumed to be zero; the variance for these values was set at 1 SE unit. The followup mean of the treated group depended on the treatment effect $(0,0.1,0.5$, and 1$)$. The followup variance of the treated group was assumed to be either 1 or 2 . The treatment effect was assumed to be fixed (shared across studies) for some scenarios and variable (i.e., a random quantity) in others. We also explored different levels of variability of treatment effects (i.e., the between-study heterogeneity; $\tau$-squared $=0,0.1$, or 0.5 ). For each scenario we simulated 1,000 meta-analyses (i.e., $5,000,10,000$, and 20,000 studies when the number of studies per meta-analysis was 5,10 , or 20 respectively).

Table 1. Simulation parameters and values used*


## Meta-Analysis Methods

For each simulation scenario we performed meta-analyses using fixed and random effects inverse variance models. For random effects analyses the between-study variance (heterogeneity) was estimated using the DerSimonian-Laird method. ${ }^{1}$ We considered three types of scenarios for the analysis of the simulated data, to reflect different levels of reporting across studies:

1. Availability of "complete data" from all studies, including the correlation of the baseline and followup values in each study group. This reflects a "best case" scenario for meta-analysis based on aggregate data: all studies report adequate data for synthesizing net change values, while accounting for the correlation of baseline and followup measurements in each study group.
2. Availability of "incomplete data" from all studies, i.e. missing correlation values for all studies (both treatment and control groups). This reflects the worst case scenario in meta-analyses of published data: none of the included studies provide sufficient statistics to estimate the net change and values need to be imputed for all studies. Commonly, a value of 0.5 is used; however, sensitivity analysis using different correlation values may be performed. We present results under all 1,728 scenarios using an imputation value of 0.5 . For a typical scenario we also show results for different imputed values. Because the results follow a predictable pattern (see Discussion), we do not present results for other scenarios.
3. Availability of "partially complete data," i.e. missing correlation values from some of the included studies. This represents an intermediate case where only some of the studies report adequate data to calculate sufficient statistics whereas the within-arm correlations need to be imputed for the rest. To emulate this scenario, we generated datasets where the within-arm correlation values were missing from both the treatment and control groups from 50 percent of the studies included in each metaanalysis.

## Comparisons Between Imputation Methods

We summarized the simulation results using graphs and tables. We focus on the following measures of performance. ${ }^{5}$
a. Bias: the deviation of the summary estimates (treatment effects) obtained by using imputed correlation values compared with the simulated true parameter value.
b. Coverage: the proportion of times the obtained $95 \%$ confidence interval (from the metaanalysis of simulated studies) contains the simulated true parameter value (treatment effect).
c. Accuracy: the mean squared error (the sum of the variance and the squared bias) of the simulation.
For brevity, in the main text of the report we present results from random effects metaanalyses for all simulated magnitudes of the treatment effect, under homogeneity and different levels of heterogeneity (between-studies), and for all control group sample sizes. However, we restrict the results presented to cases where the sample size of the treatment and control groups were equal, and the baseline and followup treatment variances in the treatment group were equal. Scenarios with unequal treatment group variances (variance ratio=2) and unbalanced treatment and control groups (sample size ratio $=2$ ) produced very similar results and are summarized in Appendix B.

Throughout the report, we emphasize the impact of imputing correlation values on estimates of the treatment effect and its uncertainty. We do not expand on the inherent properties of the meta-analytic summary estimates, although we highlight key relevant findings. The performance of the common meta-analytic estimates used in our analyses is generally well-understood and has been extensively explored in a number of theoretical papers and simulation studies. ${ }^{1,6-8}$

## Results

## Aim 1. In a Representative Sample of Trials, Describe the Range of Correlation Values, $r$

All 127 studies with 281 total study groups that met criteria were included and data extracted (see Appendix C for the list of studies). From each study we extracted an average of 3.0 outcomes. Thus, in total we calculated 852 values of $r$, of which 811 (95\%) values from 123 studies were valid estimates of the correlation coefficient (i.e., between -1 and 1 ) and are analyzed further. Only two studies (with $12 r$ values) were nonrandomized, so we did not further analyze study design. No study reported $r$ values.

Given our sources of studies, kidney disease was an over-represented clinical domain: 38 studies (30\%) evaluated kidney disease; 18 (14\%) cardiology; 11 (9\%) each diabetology and pulmonology; 8 (6\%) gastroenterology; 6 (5\%) hypertension; 5 (4\%) each internal medicine and ophthalmology, 4 ( $3 \%$ ) each genetic disorders and psychiatry; and 3 or fewer each 13 other clinical domains (see Table 2). The percentages of analyzed $r$ values by clinical domain were similar, except that cardiology represented 18 percent of $r$ values but only 14 percent of studies. About half the studies ( $66,52 \%$ ) were found in the clinicaltrials.gov database; the rest were from published trials included in previous systematic reviews we have conducted.

The most common outcome type was laboratory measures ( $39 \%$ ), followed by questionnaires or scores ( $23 \%$ ), signs ( $16 \%$ ), device measures ( $15 \%$ ), and symptoms ( $3 \%$ ), and other types (3\%)-including medication use and physical tests. There were 611 values from active treatment groups and 200 from placebo/no treatment/usual care groups; the apparent disparity occurred because most studies compared two or more active treatments.

Within-group baseline sample sizes ranged from 2 to 6,264 with a median (interquartile range $[\mathrm{IQR}])$ of $69(23,169)$ participants. The median $(I Q R)$ analyzed duration of followup was $3(1.4,7.35)$ months with a range of 0.5 hours to 4.9 years.

Table 2. Descriptive characteristics of included studies

| Characteristic | Results |
| :--- | :--- |
| Number of studies | $123^{*}$ |
| Number of groups analyzed | $811^{*}$ |
| Median group sample size $\left(25^{\text {th }}, 75^{\text {th }}\right.$ percentile) | $69(23,169)$ |
| Treatment type | $611(75 \%)$ |
| Active treatment groups, $\mathrm{n}(\%)$ | $76(23,177)$ |
| Median active treatment group sample size $\left(25^{\text {th }}, 75^{\text {th }}\right.$ percentile) | $200(25 \%)$ |
| Number of inactive (no) treatment groups, $\mathrm{n}(\%)$ | $58(24,151)$ |
| Median inactive (no) treatment group sample size $\left(25^{\text {th }}, 75^{\text {th }}\right.$ percentile) |  |

Table 2. Descriptive characteristics of included studies (continued)

| Characteristic | Results |
| :---: | :---: |
| Clinical domain ${ }^{\text {² }}$ | $n$ (\% studies) [\% values] |
| Kidney disease | 38 (30\%) [31\%] |
| Cardiology | 18 (14\%) [18\%] |
| Diabetology | 11 (9\%) [9\%] |
| Pulmonology | 11 (9\%) [9\%] |
| Gastroenterology | 8 (6\%) [5\%] |
| Hypertension | 6 (5\%) [5\%] |
| Internal Medicine | 5 (4\%) [5\%] |
| Ophthalmology | 5 (4\%) [3\%] |
| Genetic disorders | 4 (3\%) [2\%] |
| Psychiatry | 4 (3\%) [4\%] |
| Critical care | 3 (2\%) [2\%] |
| Pediatrics | 3 (2\%) [3\%] |
| Rheumatology | 3 (2\%) [1\%] |
| Dermatology | 2 (2\%) [0.7\%] |
| Immunology | 2 (2\%) [0.5\%] |
| Urology | 2 (2\%) [2\%] |
| Geriatrics | 1 (1\%) [2\%] |
| Gynecology | 1 (1\%) [1\%] |
| Infectious diseases | 1 (1\%) [0.2\%] |
| Neonatology | 1 (1\%) [0.2\%] |
| Neurology | 1 (1\%) [0.7\%] |
| Orthopedics | 1 (1\%) [0.2\%] |
| Transplant | 1 (1\%) [0.5\%] |
| Outcome type | $n$ (\% studies) [\% values] |
| Device measures | 32 (26\%) [15\%] |
| Laboratory values | 61 (50\%) [39\%] |
| Other | 10 (8\%) [3\%] |
| Questionnaires/Scores | 42 (34\%) [23\%] |
| Signs | 36 (29\%) [16\%] |
| Symptoms | 7 (6\%) [3\%] |
| Followup duration, in months |  |
| All groups, median ( $25^{\text {th }}, 75^{\text {th }}$ percentile) | 3 (1.4, 7.35) |
| Active treatment, median ( $25^{\text {th }}, 75^{\text {th }}$ percentile) | 3.7 (1.4, 12.2) |
| Placebo, median ( $25^{\text {th }}, 75^{\text {th }}$ percentile) | 2.8 (0.7, 5.6) |

*41 study groups were excluded because the statistics reported resulted in impossible correlation values (lower than -1 or higher than +1 ), presumably due to rounding or reporting error. After these exclusions 4 of the 127 studies contributed no study groups to the analyses.
${ }^{\dagger}$ Including double counting where 1 study was categorized with 3 conditions and 3 studies were categorized with 2 conditions each.
$\mathrm{n}=$ number of study groups (separately derived $r$ values).

## Estimated Correlation Values

The vast majority of estimated correlation values were positive (Figure 1 and Table 3); the median (IQR) within-group correlation value across all studies was $0.59(0.40,0.81)$. For active treatment groups, correlation values had a median of $0.54(0.37,0.77)$ and for no treatment groups 0.73 ( $0.53,0.87$ ); $\mathrm{P}<0.001$. Negative correlation values were uncommon (4.1\%). The distributions of correlation values were heterogeneous ( $\mathrm{P}<0.001$ ) across both outcome types (Figure 2) and clinical domains (Figure 3).

As shown in Figure 4, the estimated correlation did not appear to be associated with increasing followup duration (Spearman rho $=-0.07 ; \mathrm{P}=0.054$ ); this was true both among active treatment (rho $=-0.03 ; \mathrm{P}=0.53$ ) and no treatment groups (rho $=-0.05 ; \mathrm{P}=0.46$ ). As shown in Figure 5, correlation values were lower with increasing baseline sample size (rho $=-0.09$; $\mathrm{P}=0.017$ ). This effect was present among no treatment groups (rho $=-0.25 ; \mathrm{P}<0.001$ ), but apparently not among active treatment groups (rho $=-0.02 ; \mathrm{P}=0.70$ ).

To explore the association of the correlation coefficient with study or group-level characteristics we used a multivariable linear mixed effects model. The model identified a statistically significant effect of treatment type on the estimated correlation coefficient (correlation values were lower by 0.18 in active treatment versus placebo/no treatment groups; $\mathrm{P}<0.001$ ), after adjusting for baseline sample size, medical field, study duration, and outcome measure type, while accounting for clustering of treatment groups within studies. Inclusion of a cross-product term between study duration and treatment type did not reveal statistically significant effect modification ( $\mathrm{P}=0.60$ ), indicating that there is no differential effect of study duration on $r$ values by treatment type. However, inclusion of a product term between baseline sample size and treatment type demonstrated statistically significant effect modification $(\mathrm{P}=0.007)$, suggesting that larger baseline sample size was more strongly associated with lower correlation coefficient values in placebo/no treatment groups, compared with active treatment groups.

Figure 1. Histograms of the estimated correlation values across study groups


Table 3. Within-group estimated correlation values by group characteristics

| Group Characteristic | Median | $25^{\text {th }}, 75^{\text {th }}$ <br> Percentile | Min, Max | Comparison <br> Between <br> Groups |
| :--- | :--- | :--- | :--- | :--- |
| All groups | 0.59 | $0.40,0.81$ | $-1.00,1.00$ | NA |
| Active treatment | 0.54 | $0.37,0.77$ | $-1.00,1.00$ | $\mathrm{P}<0.001$ |
| Inactive (no) treatment | 0.73 | $0.53,0.87$ | $-0.03,1.00$ |  |
| Outcome types | 0.83 | $0.61,0.94$ | $-0.42,1.00$ | $\mathrm{P}<0.001$ |
| Device measure | 0.63 | $0.39,0.81$ | $-0.94,1.00$ |  |
| Lab | 0.51 | $0.37,0.72$ | $-0.77,1.00$ |  |
| Sign | 0.51 | $0.34,0.68$ | $-1.00,1.00$ |  |
| Questionnaire/Score | 0.44 | $0.38,0.50$ | $-0.07,0.82$ |  |
| Symptoms | 0.78 | $0.71,0.87$ | $0.38,1.00$ |  |
| Other |  |  |  |  |
| Clinical domains | 0.61 | $0.44,0.82$ | $-0.88,1.00$ |  |
| Nephrology | 0.59 | $0.35,0.86$ | $-0.94,0.99$ |  |
| Cardiovascular medicine | 0.77 | $0.54,0.94$ | $-1.00,1.00$ |  |
| Pulmonary medicine | 0.65 | $0.44,0.76$ | $-0.17,0.93$ |  |
| Diabetology | 0.73 | $0.56,0.83$ | $0.25,0.91$ |  |
| Internal medicine/Geriatrics/Primary care | 0.44 | $0.23,0.55$ | $-0.38,0.99$ |  |
| Gastroenterology/Hepatology | 0.36 | $0.22,0.58$ | $0.14,1.00$ |  |
| Psychiatry | 0.6 | $0.46,0.84$ | $0.23,0.94$ |  |
| Neonatology/Pediatrics | 0.38 | $0.26,0.54$ | $-0.42,0.69$ |  |
| Ophthalmology | 0.56 | $0.38,0.70$ | $-0.07,0.84$ |  |
| Critical care | 0.52 | $0.34,0.77$ | $-0.19,1.00$ |  |
| Others |  |  |  |  |

Max = maximum; Min = minimum; NA = not applicable P -values from the Kruskall-Wallis test
Figure 2. Box plot of estimated correlation values by outcome type


Within each box, horizontal white lines denote median values; boxes extend from the $25^{\text {th }}$ to the $75^{\text {th }}$ percentile of each group's distribution of values; vertical extending lines denote adjacent values (i.e., the most extreme values within 1.5 interquartile range of the $25^{\text {th }}$ and $75^{\text {th }}$ percentile of each group); dots denote observations outside the range of adjacent values.

Figure 3. Box plot of estimated correlation values by clinical domain


Within each box, horizontal white lines denote median values; boxes extend from the $25^{\text {th }}$ to the $75^{\text {th }}$ percentile of each group's distribution of values; vertical extending lines denote adjacent values (i.e., the most extreme values within 1.5 interquartile range of the $25^{\text {th }}$ and $75^{\text {th }}$ percentile of each group); dots denote observations outside the range of adjacent values.
CRIT = critical care CVD = cardiovascular disease; DM = diabetes mellitus; GI/HEP = gastroenterology, hepatology; IM/GER/PRIM = internal medicine, geriatrics, primary care; NEO/PEDS = neonatology, pediatrics; $\mathrm{NEPH}=$ nephrology; OPHTH = ophthalmology; PSYCH = psychiatry; PULM = pulmonology

Figure 4. Scatter plot of estimated correlation values by study duration (square root transformed)

$\mathrm{mo}=$ month; $\mathrm{yr}=$ year
Red lines are locally weighted smoothing lines (LOWESS).
Figure 5. Scatter plot of estimated correlation values by baseline sample size (In-transformed)




Red lines are locally weighted smoothing lines (LOWESS).

## Aim 2. In a Representative Sample of Trials, Compare Values of the Net-Change SEs Derived From Reported Within-Group SEs, With the Net-Change SEs Derived From Estimating the Correlation Values, $r$

Figure 6 compares the reported within-group standard errors (SEs) for each study group versus SEs calculated using different imputed values ( $\rho=0,0.25,0.50$, and 0.75 ). Imputing a value of 0 (i.e., lower than the majority of within-group correlations) leads to overestimation of the within-group SEs in the majority of cases ( $95 \%$ overall; $50 \%$ by more than 1.5 times).

Similarly, when a value of 0.25 is imputed the SE of the net change is overestimated in the majority of cases ( $87 \%$ overall), however the magnitude of underestimation is smaller ( $39 \%$ by more than 1.5 times). When a value of 0.5 is imputed (i.e., a value close to the median of the empirical distribution of within-group correlation values) 62 percent of the SEs are overestimated and 38 percent are underestimated. ${ }^{\text {d }}$ Finally, when a value of 0.75 is imputed the majority of net-change SEs are underestimated (68\%).

Figure 6. Comparison between reported standard errors for within-group changes and standardized bias of imputed versus reported standard errors with different values of imputed $r$
Effect of imputation on the within-group SE
$r=0$


$$
r=0.50
$$


$S E_{\text {reported }}$ (within group)
$\mathrm{SE}=$ standard error; $\mathrm{SE}_{\text {imputed }}=$ standard error for the within-group change calculated using imputed correlation values; $\mathrm{SE}_{\text {reported }}$ $=$ standard error for the within group change as reported in the studies
Dashed horizontal lines indicate the line of no difference between reported and calculated (after imputation) standard errors. Extreme values ( $>20$ on the x -axis and $>2$ on the y -axis) have been suppressed to avoid distortion of the graph.

Figure 7 compares the net-change SEs calculated using complete data versus those calculated using different imputed values for the within-group correlation (the same value was imputed for both groups being compared). The figure shows that when the imputed value is 0 (i.e., lower than the majority of within-group correlations) the SE of the net-change is overestimated in the majority of cases ( $97 \%$ overall; $78 \%$ by more than 1.5 times). Similarly, when a value of 0.25 is imputed the SE of the net change is underestimated in the majority of cases ( $94 \%$ overall), however the magnitude of overestimation is smaller ( $73 \%$ by more than 1.5 times). When values of 0.5 or 0.75 were imputed (i.e., close or higher than the median of the empirical distribution of

[^3]within-group correlation values), SEs were still likely to be overestimated ( $83 \%$ and $70 \%$, respectively). ${ }^{\text {e }}$

Figure 7. Comparison between net-change standard errors calculated using complete data and standardized bias of net-change standard errors calculated using imputed versus reported withingroup correlation values with different values of imputed $r$

Effect of imputation on the SE of net-change

$\mathrm{SE}_{\text {imputed }}=$ standard error for the net-change calculated using within-group standards based on imputed values; $\mathrm{SE}_{\text {reported }}=$ standard error for the net-change calculated using the within-group standard errors as reported in the studies Dashed horizontal lines indicate the line of no difference between net-change standard errors based on the complete data and those based on imputed values. Extreme values ( $>20$ on the $x$-axis and $>2$ on the $y$-axis) have been suppressed to avoid distortion of the graph.

## Aim 3. By Simulation, Explore the Impact of Imputing a Range of Correlation Values, $r$, on Fixed and Random Effects Model Meta-Analyses

Here, we present results from simulations of random effects meta-analyses with 10 studies for all magnitudes of the treatment effect $(0,0.1,0.5$, or 1$)$, under homogeneity and different levels of heterogeneity ( $\tau^{2}=0,0.1$, or 0.5 ), for all control group sample sizes ( $n=20,50$, or 100 ), and for different within-group correlation parameter values ( $\rho=0,0.40,0.59$, or 0.81 ). Across

[^4]these scenarios, when data on the correlation were not missing, the simulation error ranged between 0.0010 and 0.0127 for meta-analyses with 5 studies; between 0.0007 and 0.0087 for meta-analyses with 10 studies; and between 0.0005 and 0.0062 for meta-analyses with 20 studies. We restrict the presented results to cases where the sample size of the treatment and control groups were equal, and the baseline and final measurement variances in the treatment group were also equal. The following alternative scenarios produced very similar results and are presented in Appendix B: unequal treatment group variances, imbalanced treatment and control group sample size, smaller ( 5 studies) and larger (20 studies) meta-analyses, and using a fixed effect inverse variance meta-analysis method. Similarly, results from fixed effects analyses are only presented in Appendix B. In these analyses the impact of imputing correlation values was qualitatively similar to that in random effect analyses. However, we note that coverage probabilities were generally very poor in the presence of heterogeneity.

We first present detailed results for meta-analyses where missing correlation values are imputed with a value of $r=0.5$, because this represents a standard approach in applied metaanalyses. We then assess the impact of imputation of a broad range of values, under different values of the correlation parameter.

## Imputing a Correlation Value of $\mathbf{0 . 5}$

Figures 8 to 11 show the average bias (across 1,000 simulations) for four different values of the correlation parameter $(r=0,0.40,0.59$, and 0.81$)$. Each figure shows results for three imputation scenarios: (1) complete reporting of data (hollow circles), (2) incomplete data (hollow squares), and (3) partially complete data (hollow triangles). In each figure, results are presented for three heterogeneity levels ( $\tau^{2}=0,0.1$, or 0.5 ; one scenario per row), three sample sizes (20,50, or 100 patients per randomized group; one scenario per column), and four magnitudes of the treatment effect ( $0,0.1,0.5$, and 1 ; within each panel).

Null correlation parameter $(\rho=0)$. This set of scenarios represents an extreme case where the imputed value ( $r=0.5$ ) was substantially larger compared with the parameter value ( $\rho=0$ ). The value of biases in all scenarios was close to zero (Figure 8). Notably, there were no differences across different scenarios with 0,50 , and 100 percent of studies requiring imputation of $r$.

Figure 8. Average bias across 1,000 simulated meta-analyses under various scenarios ( $\rho=0$ )

$\mathrm{SS}=$ sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$\mathrm{O}=$ meta-analyses where within-group correlations were reported from all studies; $\Delta=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing Horizontal dashed lines denote the absence of bias
$25^{\text {th }}$ percentile correlation parameter ( $\rho=0.40$ ). This set of scenarios where the imputed correlation value $(r=0.5)$ is closer to the parameter value $(\rho=0.40)$ also demonstrates that there is no bias in the estimation of the treatment effect introduced by imputing missing within-group correlation values, regardless of extent of heterogeneity, magnitude of the treatment effect, or study sample size (Figure 9). The results are nearly identical when all studies report complete data, or when 50 or 100 percent of studies do not report correlation values.

Figure 9. Average bias across 1,000 simulated meta-analyses under various scenarios ( $\rho=0.40$ )


SS = sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$\mathrm{O}=$ meta-analyses where within-group correlations were reported from all studies; $\triangle=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing Horizontal dashed lines denote the absence of bias
$50^{\text {th }}$ percentile correlation parameter ( $\rho=0.59$ ). Similar to the preceding scenario, using an imputed value of $r=0.5$ when the parameter value $\rho=0.59$ does not introduce bias in the metaanalytic estimate of the treatment effect (Figure 10).

Figure 10. Average bias across 1,000 simulated meta-analyses under various scenarios ( $\rho=0.59$ )

$\mathrm{SS}=$ sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$\mathrm{O}=$ meta-analyses where within-group correlations were reported from all studies; $\triangle=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing Horizontal dashed lines denote the absence of bias
$75^{\text {th }}$ percentile correlation parameter ( $\rho=0.81$ ). In scenarios where the imputed correlation value ( $r=0.5$ ) is substantially lower than the parameter value ( $\rho=0.81$ ), imputation of missing correlation values does not introduce bias in the estimate of the treatment effect (Figure 11).

Figure 11. Average bias across 1,000 simulated meta-analyses under various scenarios ( $\rho=0.81$ )

$$
\begin{gathered}
\rho=0.81 \\
\tau^{2}=0
\end{gathered}
$$



SS = sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$O=$ meta-analyses where within-group correlations were reported from all studies; $\triangle=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing Horizontal dashed lines denote the absence of bias

Coverage. Figures $12-15$ show the observed coverage probabilities (across 1,000 simulations) for four different values of the correlation parameter ( $\rho=0,0.40,0.59$, and 0.81 ). The figures are structured in the same way as the bias figures, presenting the same scenarios. The desired coverage probability is 0.95 , corresponding with the 95 percent confidence interval. Imputing correlation values appeared to have a substantial effect on the coverage probabilities in several of the simulated scenarios.

Null correlation parameter ( $\rho=0$ ). Contrary to the observations regarding bias, imputing missing within-group correlation values substantially affected the observed coverage probabilities in these scenarios (Figure 12). Generally, coverage probabilities using imputed data (squares in figures) were lower compared with meta-analyses using complete data (circles in figure). Imputing correlation values ( $r=0.5$ ) larger than the parameter value ( $\rho=0$ ) underestimates the SE of the within-group change, ${ }^{\mathrm{f}}$ and consequently the SE of the net change ${ }^{\mathrm{g}}$, resulting in spuriously narrow confidence intervals. Even in the absence of bias in the point estimate, narrower confidence intervals lead to lower coverage probabilities. Notably, in the presence of moderate $\left(\tau^{2}=0.1\right)$ or severe $\left(\tau^{2}=0.5\right)$ heterogeneity, coverage of the DerSimonian-Laird summary estimate was poor, regardless of whether studies reported complete data. The effect of the summary estimate's performance on coverage was substantially larger than the effect of imputation when $\tau^{2}=0.5$.

[^5]Figure 12. Coverage probabilities across 1,000 simulated meta-analyses under various scenarios ( $\rho=0$ )

$$
\begin{gathered}
\rho=0.00 \\
\tau^{2}=0
\end{gathered}
$$



## treatment effect

SS = sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$\mathrm{O}=$ meta-analyses where within-group correlations were reported from all studies; $\Delta=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing Horizontal dashed lines denote the nominal coverage probability of the estimator
$25^{\text {th }}$ percentile correlation parameter ( $\rho=0.40$ ). In these scenarios the imputed value ( $r=0.5$ ) is closer to the true value ( $\rho=0.40$ ). Thus, the impact of imputation on the study-specific SEs is smaller, leading to smaller differences in coverage probabilities between simulations with different percentages of studies requiring imputation (Figure 13). Different levels of coverage across the simulations with different degrees of heterogeneity reflect the poor performance of the DerSimonian-Laird estimate in the presence of substantial heterogeneity.

Figure 13. Coverage probabilities across 1,000 simulated meta-analyses under various scenarios ( $\rho=0.40$ )

$$
\begin{gathered}
\rho=0.40 \\
\tau^{2}=0
\end{gathered}
$$



## treatment effect

$\mathrm{SS}=$ sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$\mathrm{O}=$ meta-analyses where within-group correlations were reported from all studies; $\Delta=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing Horizontal dashed lines denote the nominal coverage probability of the estimator
$50^{\text {th }}$ percentile correlation parameter ( $\rho=0.59$ ). In these scenarios the imputed value is also very close to the true value ( $\rho=0.59$ ), yielding similar results as the scenario above (Figure 14).

Figure 14. Coverage probabilities across 1,000 simulated meta-analyses under various scenarios ( $\rho=0.59$ )

$$
\begin{gathered}
\rho=0.59 \\
\tau^{2}=0
\end{gathered}
$$



SS = sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$O=$ meta-analyses where within-group correlations were reported from all studies; $\Delta=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing Horizontal dashed lines denote the nominal coverage probability of the estimator
$75^{\text {th }}$ percentile correlation parameter ( $\rho=0.81$ ). These scenarios represent cases where the imputed value ( $r=0.5$ ) is substantially lower than the parameter value ( $\rho=0.81$ ). Thus, the estimated study-specific SEs of the net change when imputing the within-group correlation is likely to be larger compared with those using the complete data (Figure 15). Thus, meta-analyses using imputed data will tend to produce wider confidence intervals and greater coverage compared with meta-analysis using complete data. In the absence of heterogeneity, imputation
produced over-conservative coverage probabilities (higher than 0.95 ). In the presence of heterogeneity ( $\tau^{2}=0.1$ or 0.5 ), imputation of correlation values lower than the parameter value appeared to partly "counteract" the lower-than-nominal coverage probabilities inherent in the DerSimonian-Laird estimate to some extent.

Figure 15. Coverage probabilities across 1,000 simulated meta-analyses under various scenarios ( $\rho=0.81$ )

$$
\begin{gathered}
\rho=0.81 \\
\tau^{2}=0
\end{gathered}
$$



## treatment effect

$\mathrm{SS}=$ sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$O=$ meta-analyses where within-group correlations were reported from all studies; $\triangle=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing Horizontal dashed lines denote the nominal coverage probability of the estimator

Mean square error (MSE). Figures 16 to 19 show the MSE (across 1,000 simulations) for four different values of the correlation parameter ( $\rho=0,0.40,0.59$, and 0.81 ). The figures are structured in the same way as the bias figures, presenting the same scenarios. Generally, imputing some ( $50 \%$ ) or all correlation values did not have an appreciable impact on the summary estimate's MSE. Furthermore, in all scenarios assessed it was clear that between-study heterogeneity and, to a smaller extent study sample size, were the key determinants of MSE.

All correlation parameters ( $\rho=0,0.40,0.59$, and 0.81 ). The figures show that, regardless of the imputed correlation parameters, the imputation approach did not appreciably impact the MSE. Differences between scenarios where different percentages of available studies required imputation were much smaller in magnitude compared with the impact of between-study heterogeneity (across columns in the figure) and sample size (across rows).

Figure 16. Mean squared error across 1,000 simulated meta-analyses under various scenarios ( $\mathrm{p}=0$ )

$$
\begin{gathered}
\rho=0.00 \\
\tau^{2}=0
\end{gathered}
$$



MSE $=$ mean squared error; SS $=$ sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$O=$ meta-analyses where within-group correlations were reported from all studies; $\Delta=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing

Figure 17. Mean squared error across 1,000 simulated meta-analyses under various scenarios ( $\rho=0.40$ )


MSE = mean squared error; $\mathrm{SS}=$ sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$O=$ meta-analyses where within-group correlations were reported from all studies; $\Delta=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing

Figure 18. Mean squared error across 1,000 simulated meta-analyses under various scenarios ( $\rho=0.59$ )


MSE = mean squared error; $\mathrm{SS}=$ sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$O=$ meta-analyses where within-group correlations were reported from all studies; $\Delta=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing

Figure 19. Mean squared error across 1,000 simulated meta-analyses under various scenarios ( $\rho=0.81$ )

$$
\begin{gathered}
\rho=0.81 \\
\tau^{2}=0
\end{gathered}
$$



MSE = mean squared error; $\mathrm{SS}=$ sample size; $\mathrm{SSR}=$ sample size ratio; $\mathrm{VR}=$ variance ratio; $\rho=$ correlation parameter value; $\tau^{2}=$ between-study variance of the treatment effect
$O=$ meta-analyses where within-group correlations were reported from all studies; $\Delta=$ meta-analyses where $50 \%$ of the withingroup correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing

## Imputing Alternative Correlation Values

To illustrate the impact of imputing alternative values when the within-group correlation is not reported, we use two illustrative simulation scenarios: one with no heterogeneity ( $\tau^{2}=0$ ) and one with moderate heterogeneity ( $\left.\tau^{2}=0.1\right)$. Both scenarios were based on meta-analyses of 10 studies, with 100 patients in the treatment and control groups, where the variance in the
treatment group was not affected by treatment, over alternative values of the correlation parameter ( $\rho=0,0.40,0.59$, or 0.81 ). For 1,000 meta-analyses simulated under these scenarios, we explored the impact of imputing correlation values ranging from -1 to 1 , in steps of 0.10 .

## Bias

Consistent with the previously examined simulation scenarios, imputations of different values for the study-specific correlation when the information is missing from 50 or 100 percent of the included studies does not result in bias (average bias was 0 for all imputed values; data not shown).

## Coverage Probabilities

Figure 20 presents the results for observed coverage probabilities across 1,000 simulated meta-analyses, when the nominal coverage level is 0.95 . As expected, imputation of different correlation values had substantial impact on the coverage probabilities of the summary estimate. For all tested correlation parameter values ( $\rho=0,0.40,0.59$, or 0.81 ), imputing larger values (closer to 1) reduced the coverage probability. In the case of no between-study heterogeneity $\left(\tau^{2}=0\right)$, coverage probabilities were close to the nominal level $(0.95)$ when the imputed value was close to the parameter value. When the imputed value was lower than the parameter value coverage was higher than nominal; the contrary was observed when the imputed value was larger than the parameter value (i.e. coverage was lower than the nominal level).

In the presence of moderate heterogeneity $\left(\tau^{2}=0.1\right)$ coverage probabilities were lower than nominal for all imputed and parameter values of the correlation. In these scenarios coverage was greater (and closer to nominal) when lower imputed values were used.

Figure 20. Coverage probabilities for alternative imputed correlation values for different values of the correlation parameter (meta-analysis of 5 studies)



This figure illustrates the impact of imputing alternative values when all studies in a meta-analysis do not report the within-group estimates of the correlation, for 4 different parameter values ( $\rho=0,0.40,0.59$, and 0.81 ), under homogeneity (left panel) or heterogeneity (right panel) of treatment effects across studies. The horizontal red lines indicate the nominal coverage probability.

## MSE

Consistent with the previously examined simulation scenarios, imputation of different values for the within-group correlation, does not appreciably affect MSE (data not shown).

## Summary of Key Findings

- In a large dataset of trials allowing the calculation of the within-arm correlation values, we found that estimated correlation values are positive in the vast majority of cases, regardless of the specific outcome measure and duration of followup.

0 Median (IQR) within-group correlation across studies $0.59(0.40,0.81)$.
0 Correlation values were statistically significantly higher for no treatment groups (median 0.73 ) than for active treatments (median $0.54 ; \mathrm{P}<0.001$ ).
0 Correlation values were statistically significantly different across different outcome types and different clinical domains.
0 There was no clear association between followup duration and correlation value for either active treatments or no treatment groups; however, correlation values were statistically significantly lower with increasing sample size of no treatment groups, but not active treatment groups.

- The choice of imputed correlation values can have a substantial impact on the estimate of the within-group and net-change SEs. Not unexpectedly, the difference between SEs calculated using complete study data versus those based on imputed correlation values depends on the difference of the imputed value from the study estimate of the correlation.
- In simulation studies of meta-analyses with different "true" correlation values across a number of representative scenarios we found that:
o Imputation of any value for the within-group correlation parameter does not result in bias in the estimation of the meta-analyzed summary treatment effect.
o The imputed value affects the coverage probability of the meta-analytic summary estimate: imputing values larger than the "true" value produces coverage lower than that attained with complete data; imputing values lower than the "true" value produces coverage greater than that attained with complete data. However, the DerSimonian-Laird meta-analytic estimator often has poor coverage in the presence of moderate to large heterogeneity; thus, the impact of different imputed correlation values has a relatively small effect on coverage in settings of heterogeneous meta-analyses.
o Accuracy, as represented by MSE, was not appreciably impacted by the specific imputation approach.


## Discussion

The net difference in the change from baseline is a frequently used metric in meta-analysis of continuous outcomes, but statistics sufficient for meta-analysis are commonly reported only incompletely. Specifically, the variance of this metric is often not possible to calculate with algebraic computations, because the within-arm correlations are not reported. Imputing the missing correlations (and by extension the missing variances) is arguably preferable to excluding the respective studies from the meta-analysis. ${ }^{2,9,10}$ We report the empirical distribution of withinarm correlation coefficients from a large number of studies where such information was algebraically extractable. We also explored the effects of imputing a range of values for the correlation coefficient in a simulation analysis. To our knowledge, this analysis is the first such exploration of real-life within-group correlations and of the effect of imputing different correlations in meta-analyses. While we analyzed a large body of comparative studies, we acknowledge that studies available to us from our previous systematic reviews and from ClinicalTrials.gov may not be completely representative of studies encountered in a typical systematic review. In particular, nephrology studies are overrepresented in our empirical dataset. Nevertheless, it appears unlikely that our included studies were a biased sample of studies that report adequate data to estimate within-group correlation. However, it is plausible that, in general, studies that report all data for baseline, final, and change values may be inherently different (biased) compared with studies that fail to report change data. This latter possibility, however, cannot be tested from the reported data. It remains a possibility, though, that our findings of typical correlations in studies could deviate from the true range of correlations in studies with missing data.

The main limitation to a determination of actual correlation values in published studies is the inherent error involved in back-calculating correlation values from imprecise reported standard deviations or standard errors (SEs). The fact that 5 percent of calculated values were implausible (outside the bounds of -1 to +1 ) indicates that data extracted from publications may not always be accurate or sufficiently precise due to rounding errors. However, there is no reason to think that our estimates were biased toward under- or over-estimating correlation values. Furthermore, while we covered many scenarios in our simulations, a large number of other scenarios could have been investigated (including using random-effects models different than DerSimmonian and Laird, using different values of $\rho$ for treated and untreated arms, and using numerous other imputed values of $r$ ). However, we believe that our simulations cover the range of greatest interest to applied meta-analyses.

We evaluated 811 within-group correlation values from 123 studies with 281 study groups. As expected, the vast majority ( $96 \%$ ) were positive. For most realistic clinical scenarios, baseline and final measurements in the same individual will tend to be similar (be positively correlated with each other). We have not identified a realistic scenario where, in contrast, one would expect baseline and final values to be negatively correlated (i.e., $r<0$ ), though such scenarios may very well be possible. There are several possible explanations for the few negative correlations in our empirical sample. First, they are sample estimates of unobserved true correlation coefficients, but because of random variation they have negative values, even though the true correlations were not negative. Second, our calculations assumed normal distributions (when extracting data from individual studies), which may be ill-justified for some studies. Third, some may correspond to clinical scenarios where one would expect a negative correlation between baseline and final measurements, although on inspection of the database we did not recognize such a scenario. Finally, we derived the correlation estimates using algebraic calculations from quantities
reported in the papers, and thus reporting inconsistencies, rounding errors, or other mistakes in the papers themselves may also play a role. Our best guess is that this latter reason explains most of the instances of estimated negative correlation. These studies ( $4 \%$ of the total), together with the 5 percent of studies with estimates of $r$ outside the range $[-1,1]$, which are clearly due to rounding or reporting errors, suggest that poor estimates of $r$ are common, even among the studies with seemingly reasonable estimates (the $91 \%$ overall with estimates of $r$ between 0 and 1).

We describe variation in the distribution of the within-group correlation values by the characteristics of the outcomes, the interventions, and the studies. For example, on average, correlation values were higher in control (no treatment) study groups with no active intervention compared with study groups with active interventions. This is expected, as an intervention introduces an additional variance component (related to the variability of the treatment effect), reducing the observed within-group correlation in treated groups. It might not be unreasonable to impute a lower correlation value for the treatment group than for the no treatment group within a study, although there was substantial heterogeneity in the estimated within-arm correlations among both active intervention and no treatment study arms. In addition, the distributions of correlation values overlapped substantially between active and no treatment arms. Thus, the use of differential imputation of correlation values in study groups may be overkill. Similarly, though we found differences in correlation values across different clinical domains and different outcome types, we do not believe this analysis supports imputing different correlation values for different clinical domains or outcomes. It should be noted that any categorization of clinical domains and outcome types is arbitrary and imperfect but our sample size was much too small to closely investigate specific clinical domains and outcomes. Overall, we would not recommend selecting an imputation value (e.g., from a regression) using the characteristics of the outcome, the study group, and the study as predictors. Our sampling scheme was based on convenience of accessing the information of interest, and many types of outcomes, diseases, interventions and populations were not included. Therefore, predictions from regression models built in this sample are probably not generalizable. Finally, although randomized crossover studies were not the focus of this report, our recommendations should be largely applicable to such studies as well.

So how should meta-analysts go about imputing the missing correlations? Our simulation studies indicate that the choice of imputed correlation value primarily affects the coverage probabilities of the final meta-analysis estimate, rather than its bias. In other words, the choice of imputed $r$ value affects the probability that the "true" estimate falls within the 95 percent confidence interval of the summary estimate, but is unlikely to bias the summary estimate in one direction or the other. The absence of bias is expected because: (1) the correlation of baseline and final values is not used in the calculation of the study-specific effect size; and (2) the variance of the study specific effect size (and, consequently, the corresponding weight) is not dependent on its value in the case of meta-analysis of continuous outcomes. Thus, even though the imputation of missing correlation values is bound to affect the weights of the study specific point estimates (because it affects the SE of the net change), it does not introduce bias in the estimate of the treatment effect. However, the farther the imputed correlation value is from the (unknown) true value, the larger the impact on the coverage probability of the meta-analysis estimate. Imputing a larger-than-true value results in smaller study variances, and imputing a lower-than-true value results in larger study variances. Even so, the effect on the coverage probabilities is relatively small, and arguably inconsequential for many meta-analyses. Although
not the focus of the current paper, our simulations demonstrated that fixed effects meta-analysis has poor coverage when the data are derived from truly heterogeneous studies. The DerSimonian-Laird method had much better performance, even though its coverage probability in the presence of moderate to severe heterogeneity was also lower than nominal when the number of studies was small. Suboptimal coverage with increasing between-study heterogeneity has been reported in previous simulation studies of the DerSimonian-Laird method. ${ }^{6-8}$ Iterative estimators of between-study heterogeneity have better performance in the presence of such extreme heterogeneity.

Based on the above, including our finding of a median correlation value across studies of 0.59 and our simulations of meta-analyses with convenience correlation value estimates of 0.25 , 0.5 , and 0.75 , we propose the following algorithm for meta-analyses of continuous outcomes where the net difference in the change from baseline is the metric of choice, and within-arm correlation values require imputation due to insufficiently reported data (Table 4). Follman et al. (1992) also proposed using 0.5 as the "default" imputed value, on the basis of statistical efficiency. ${ }^{9}$ We acknowledge that imputation of a "fixed" number ignores the uncertainty of the imputed value. Nonetheless, in typical meta-analysis applications (where the number of included studies is small and with limited covariate information) theory-motivated approaches, such as multiple imputation, are unlikely to be of practical use. ${ }^{11}$ Furthermore, verifying the assumptions underlying such methods (e.g., that data are missing at random) is probably impossible in retrospective (i.e., literature-based) meta-analyses.

## Table 4. Proposed algorithm for handling studies with missing data for standard error of the net change

| Step* | Description | Comment or rationale | Strength ${ }^{\top}$ [High/Low] |
| :---: | :---: | :---: | :---: |
| 1 | Include all studies in the main analysis by imputing missing within-group correlations | Maximizes use of available information When only the within-group correlation is missing, the within-group variance can still be estimated within an interval. This partial information should not be discarded In most cases, the optimal imputation value will be unknowable. | High |
| $2^{\ddagger}$ | If a majority of studies report withingroup correlations, use the median correlation as a main analysis. | This empirical imputation is arbitrary, as there is no guarantee that studies requiring imputation would have similar values. <br> Choosing the lowest observed positive correlation, or the $25^{\text {th }}$ percentile of the observed correlations results in greater study variances and thus lower weights in a meta-analysis. <br> However, we see no particular reason to favor any particular percentile (e.g., median versus $25^{\text {th }}$ percentile) | Low ${ }^{\text {s }}$ |
| 3 | If a majority or all studies do not report within-group correlations, and in the absence of other relevant data, impute a value of 0.5 to 0.6 for the main analysis. <br> An alternative is to impute a value of about 0.5-0.6 for treatment groups and about 0.75 for no treatment groups. | The median value in the empirical sample was 0.59 . The median value in the empirical sample of active treatment groups was 0.54 and of no treatment groups was 0.73 . <br> Being in the middle of the domain of values for positive correlations, imputed values of 0.5 to 0.6 minimizes the difference from the unknown true value, and thus the effect on the coverage probability of the meta-analysis estimate For most real-life scenarios we expect non-negative within-group correlations <br> We see no argument in favor of using different correlation values for each study | Low |
| 4 | Perform sensitivity analyses for a range of plausible values | In our simulation studies imputing a value of 0.5 has a small effect on coverage probabilities (and no effects on bias) over a wide range of scenarios. We conjecture that most often sensitivity analyses will not change meta-analysis conclusions. Reasonable to include 0 as the lower bound. In the absence of external information, the upper bound could be 0.8 (75th percentile in our empirical sample) | Low ${ }^{\text {II }}$ |

* Step 1 should be done in all cases where meta-analyses of net-changes are performed. Steps 2 to 4 should be considered in order of preference.
$\dagger$ High strength: Failure to follow recommendation may result in substantial bias. Low strength: Choice of whether recommendation is followed is unlikely to alter or bias the meta-analysis. This strength scale was developed by the authors and is arbitrary. We expect it to be described more fully in a forthcoming article.
$\ddagger$ In place of step 2, others have proposed the use of multiple imputation, if the meta-analysis has a large number of studies and a majority of them report the correlation.
$\S$ This step has face validity, but was not addressed in this report. It is also proposed by Wiebe et al. ${ }^{2}$
$\|$ This is good practice, but failure to perform sensitivity analyses will likely not result in misleading conclusions.


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## Appendix A. Detailed Simulation Methods

We simulated meta-analyses of $J$ parallel-group design randomized trials with two treatment groups (treatment, $T$, and control, $C$, with corresponding sample sizes $N_{T}$ and $N_{c}$, same for all studies in a meta-analysis) and a continuous outcome, measured at baseline (T1 and C1, respectively) and after follow-up (T2 and C2, respectively). We assume the same data generating mechanism (model) for all studies, which is described below.

We assume that the study groups are independent (i.e. patients are either treated or nontreated), all patients are compliant to the treatment assignment, and have complete followup (no drop-outs). Cases of imperfect compliance would tend to make the outcomes in the compared groups similar, but they would not affect the overall conclusions of the simulation study. Further, we assume that the outcome values for the $i$-th control individual in the $j$-th study, at baseline ( $m_{C 1, i j}$ ) and after followup ( $m_{C 2, i j}$ ) are generated by a bivariate normal distribution:

$$
\binom{m_{C 1, i j}}{m_{C 2, i j}} \sim B V N\left(\binom{\mu_{C 1, j}}{\mu_{C 2, j}}, \Sigma_{C_{j}}\right)
$$

Here, $\mu_{C 1, j}$ and $\mu_{C 2, j}$ are the "true" pre- and post-treatment means in the control arm, and $\Sigma_{C_{j}}$ is their covariance matrix:

$$
\Sigma_{C_{j}}=\left(\begin{array}{cc}
\sigma_{C 1, j}^{2} & \rho_{C} \sigma_{C 1, j} \sigma_{C 2, j} \\
\rho_{C} \sigma_{C 1, j} \sigma_{C 2, j} & \sigma_{C 2, j}^{2}
\end{array}\right)
$$

$\sigma_{C 1, j}^{2}$ and $\sigma_{C 2, j}^{2}$ are the variances of the pre- and post-treatment measurements, and $\rho_{C}$ is the correlation between pre- and post- treatment measurements. For simplicity, and since the control arm does not undergo intervention we assume that the variance in the $j$-th study remains constant over time ( $\sigma_{C 1, j}^{2}=\sigma_{C 2, j}^{2}=\sigma_{C j}^{2}$ ); thus, the covariance matrix can be written as

$$
\Sigma_{C_{j}}=\left(\begin{array}{cc}
\sigma_{C j}^{2} & \rho_{C} \sigma_{C j}^{2} \\
\rho_{C} \sigma_{C j}^{2} & \sigma_{C j}^{2}
\end{array}\right)
$$

Similar to the control arm, the general data generating form for the $i$-th individual on the treatment arm of the $j$-th study is

$$
\binom{m_{T 1, i j}}{m_{T 2, i j}} \sim B V N\left(\binom{\mu_{T 1, j}}{\mu_{T 2, j}}, \Sigma_{T_{j}}\right)
$$

However, because we are interested in modeling randomized trials, the "true" pre-treatment means in the treatment and control groups can be assumed to be equal: $\mu_{C 1, j}=\mu_{T 1, j}$. Further the pre-treatment variances can also be considered to be equal: $\sigma_{C 1, j}^{2}=\sigma_{T 1, j}^{2}$. However, we allow for the treatment to (potentially) have an impact on the post-treatment mean and variance of
individuals in the treatment group. Thus, the study level-data for the treatment group are generated by the following bivariate normal distribution:

$$
\binom{m_{T 1, i j}}{m_{T 2, i j}} \sim B V N\left(\binom{\mu_{C 1, j}}{\mu_{T 2, j}}, \Sigma_{T_{j}}\right), \text { with } \Sigma_{T_{j}}=\left(\begin{array}{cc}
\sigma_{C j}^{2} & \rho_{T} \sigma_{C j} \sigma_{T 2, j} \\
\rho_{T} \sigma_{C j} \sigma_{T 2, j} & \sigma_{T 2, j}^{2}
\end{array}\right)
$$

where $\rho_{T}$ is the correlation between pre- and post-treatment measurements in the treatment arm (which in theory can differ from $\rho_{c}$ ). For our simulations we assessed different values of correlations (based on the empirical component of the project) and assumed that $\rho_{T}=\rho_{C}$.

The effect of treatment ${ }^{\mathrm{h}}$ in the $j$-th study can be written as

$$
\delta_{j}=\mu_{T 2, j}-\mu_{T 1, j}=\mu_{T 2, j}-\mu_{C 1, j}
$$

This allows us to write the treatment group generative distribution as:

$$
\binom{m_{T 1, i j}}{m_{T 2, i j}} \sim B V N\left(\binom{\mu_{C 1, j}}{\mu_{C 1, j}+\delta_{j}}, \Sigma_{T_{j}}\right)
$$

Note that the total number of individuals in the treatment $\left(\mathrm{N}_{\mathrm{T}}\right)$ and control $\left(\mathrm{N}_{\mathrm{C}}\right)$ groups does not have to be the same (in the simulation we denote the sample size ratio as $\operatorname{SSR}=\frac{\mathrm{N}_{\mathrm{T}}}{\mathrm{N}_{\mathrm{c}}}$ ).
Finally, we were interested in modeling (at least for some simulation scenarios) variability in the treatment effect between studies. To achieve this, we assume that the study-specific treatment effects follow a normal distribution with a common "average" treatment effect ( $\Delta$ ) and some variance ( $\tau^{2}$ ): $\delta_{j} \sim N\left(\Delta, \tau^{2}\right)$, reflecting standard meta-analytic distributional assumptions. This additional variability can be incorporated in the covariance matrix of the treatment group as follows:

$$
\binom{\mathrm{m}_{\mathrm{T} 1, \mathrm{i}, \mathrm{j}}}{\mathrm{~m}_{\mathrm{T} 2, \mathrm{i}, \mathrm{j}}} \sim \mathrm{BVN}\left(\binom{\mu_{\mathrm{C} 1, \mathrm{j}}}{\mu_{\mathrm{C} 1, \mathrm{j}}+\Delta}, \Sigma_{\mathrm{T}_{\mathrm{j}}}\right) \text { and } \Sigma_{\mathrm{T}_{\mathrm{j}}}=\left(\begin{array}{cc}
\sigma_{\mathrm{C} 1, \mathrm{j}}^{2} & \rho_{\mathrm{T}} \sigma_{\mathrm{C} 1, \mathrm{j}} \sigma_{\mathrm{T} 2, \mathrm{j}} \\
\rho_{\mathrm{T}} \sigma_{\mathrm{C} 1, \mathrm{j}} \sigma_{\mathrm{T} 2, \mathrm{j}} & \sigma_{\mathrm{T} 2, \mathrm{j}}^{2}+\tau^{2}
\end{array}\right)
$$

The table below summarizes the parameters of the scenarios explored in our simulations. For each scenario we simulated 1000 meta-analyses (i.e., a total of 5000, 10000, and 20000 studies when $J$ was 5,10 , or 20 respectively).

[^6]| Parameter | Explanation | Values used |
| :---: | :---: | :---: |
| $\mu_{C 1, j}$ | Pre-treatment mean in the control group | 0 |
| $\mu_{C 2, j}$ | Post-treatment mean in the controls; set equal to the pre-treatment variance $\left(\mu_{C 1, j}=\mu_{C 2, j}\right)$ | 0 |
| $\sigma_{C 1, j}^{2}$ | Pre-treatment variance in the controls | 1 |
| $\sigma_{C 2, j}^{2}$ | Pre-treatment variance in the controls | 1 |
| $\rho_{C}$ | Within-group correlation in the controls | 0 or 0.41 or 0.59 or 0.81 (these values correspond to the presence of no correlation between pre-and posttreatment values, and the $25^{\text {th }}, 50^{\text {th }}$, and $75^{\text {th }}$ percentile of the empirical correlation distribution, respectively) |
| $\mu_{T 1, j}$ | Pre-treatment mean in the treatment group | 0 |
| $\mu_{T 2, j}$ | Post-treatment mean in the treatment group | Drawn from a distribution; see $\delta_{j}, \Delta$, and $\tau^{2}$ |
| $\sigma_{T 1, j}^{2}$ | Pre-treatment variance in the treated; set equal to the pretreatment variance in the controls | 1 |
| $\sigma_{T 2, j}^{2}$ | Post-treatment variance in the treated group; based on the relative magnitude of the variances | Based on VR |
| VR | Variance ratio, the ratio of the post- to pretreatment variance in the controls, such that $V R=\frac{\sigma_{T 2, j}^{2}}{\sigma_{T 1, j}^{2}}$ | 1 or 2 |
| $\rho_{T}$ | Within-group correlation in the treated group; $\rho_{T}=\rho_{C}$ | Same as $\rho_{C}$ |
| $N_{c}$ | Sample size in the controls | 20 or 50 or 100 |
| $N_{T}$ | Sample size in the treated group; set based on the SSR (see below) | Based on the control group sample size; see SSR |
| SSR | Sample size ratio (treated/controls); $S S R=\frac{N_{T}}{N_{C}}$ | 1 or 2 |
| $\delta_{j}$ | The treatment effect in each study $\left(\delta_{j}=\mu_{T 2, j}-\right.$ $\left.\mu_{T 1, j}=\mu_{T 2, j}-\mu_{C 1, j}\right)$; drawn from a distribution of effects (see below) | Drawn from a distribution; see $\Delta$ and $\tau^{2}$ |
| $\Delta$ | The average treatment effect across studies | 0 or 0.1 or 0.5 or 1 (ranges from null effect to a large effect) |
| $\tau^{2}$ | The between-study variance of the treatment effects | 0 or 0.1 or 0.5 (ranges from no heterogeneity to substantial heterogeneity) |
| J | The number of studies in each meta-analysis | 5 or 10 or 20 (the vast majority of meta-analyses of clinical trials include less than 20 studies) |
| Number of simulation scenarios | The product of the number of values explored for each parameter in the simulation | 1728 |

## Appendix B. Additional Simulation Results

This Appendix presents additional simulation results for smaller ( 5 studies) and larger (20 studies) meta-analyses for the scenarios presented in the main report. We also present complete numerical results for all scenarios and all meta-analysis sizes, both under fixed and random effects meta-analyses.

For all figures in this file we use the following abbreviations and conventions: SS, sample size, SSR , sample size ratio; VR, variance ratio; $\rho$, correlation parameter value; $\tau^{2}$, betweenstudy variance of the treatment effect. $O=$ meta-analyses where within-group correlations were reported from all studies; $\triangle=$ meta-analyses where $50 \%$ of the within-group correlations were missing; $\square=$ meta-analyses where all within-group correlations were missing.

Bias
Figure B-1. Average bias across 1000 simulated meta-analyses under various scenarios ( $\rho=0$, meta-analyses with 5 studies)


Figure B-2. Average bias across 1000 simulated meta-analyses under various scenarios ( $\rho=0.40$, metaanalyses with 5 studies)


Figure B-3. Average bias across 1000 simulated meta-analyses under various scenarios ( $\rho=0.59$,

$$
\begin{gathered}
\rho=0.59 \\
\tau^{2}=0
\end{gathered}
$$


-


## treatment effect

Figure B-4. Average bias across 1000 simulated meta-analyses under various scenarios ( $\rho=0.81$, meta-analyses with 5 studies)


## Coverage probability

Figure B-5. Coverage probabilities across 1000 simulated meta-analyses under various scenarios ( $\rho=0$, metaanalyses with 5 studies)


Figure B-6. Coverage probabilities across 1000 simulated meta-analyses under various scenarios ( $\rho=0.40$, meta-analyses with 5 studies)


Figure B-7. Coverage probabilities across 1000 simulated meta-analyses under various scenarios ( $\rho=0.59$, meta-analyses with 5 studies)

$$
\begin{gathered}
\rho=0.59 \\
\tau^{2}=0
\end{gathered}
$$



Figure B-8. Coverage probabilities across 1000 simulated meta-analyses under various scenarios ( $\rho=0.81$, meta-analyses with 5 studies)

$$
\begin{gathered}
\rho=0.81 \\
\tau^{2}=0
\end{gathered}
$$



Figure B-9. Mean squared error across 1000 simulated meta-analyses under various scenarios ( $\rho=0$, meta-analyses with 5 studies)

$$
\begin{gathered}
\rho=0.00 \\
\tau^{2}=0
\end{gathered}
$$



Figure B-10. Mean squared error across 1000 simulated meta-analyses under various scenarios ( $\rho=0.40$, meta-analyses with 5 studies)


Figure B-11. Mean squared error across 1000 simulated meta-analyses under various scenarios ( $\rho=0.59$, meta-analyses with 5 studies)


Figure B-12. Mean squared error across 1000 simulated meta-analyses under various scenarios ( $\rho=0.81$, meta-analyses with 5 studies)


## Bias

Figure B-13. Average bias across 1000 simulated meta-analyses under various scenarios ( $\rho=\mathbf{0}$, metaanalyses with 20 studies)

$$
\begin{gathered}
\rho=0.00 \\
\tau^{2}=0
\end{gathered}
$$



Figure B-14. Average bias across 1000 simulated meta-analyses under various scenarios ( $\rho=0.40$, metaanalyses with 20 studies)

$$
\begin{gathered}
\rho=0.40 \\
\tau^{2}=0
\end{gathered}
$$


treatment effect

Figure B-15. Average bias across 1000 simulated meta-analyses under various scenarios ( $\rho=0.59$, metaanalyses with 20 studies)

$$
\begin{gathered}
\rho=0.59 \\
\tau^{2}=0
\end{gathered}
$$


treatment effect

Figure B-16. Average bias across 1000 simulated meta-analyses under various scenarios ( $\rho=0.81$, metaanalyses with 20 studies)

$$
\begin{gathered}
\rho=0.81 \\
\tau^{2}=0
\end{gathered}
$$


treatment effect

## Coverage probability

Figure B-17. Coverage probabilities across 1000 simulated meta-analyses under various scenarios ( $\rho=0$, meta-analyses with 20 studies)

$$
\begin{gathered}
\rho=0.00 \\
\tau^{2}=0
\end{gathered}
$$



Figure B-18. Coverage probabilities across 1000 simulated meta-analyses under various scenarios ( $\rho=0.40$, meta-analyses with 20 studies)

$$
\begin{gathered}
\rho=0.40 \\
\tau^{2}=0
\end{gathered}
$$



Figure B-19. Coverage probabilities across 1000 simulated meta-analyses under various scenarios ( $\rho=0.59$, meta-analyses with 20 studies)

$$
\begin{gathered}
\rho=0.59 \\
\tau^{2}=0
\end{gathered}
$$






Figure B-20. Coverage probabilities across 1000 simulated meta-analyses under various scenarios ( $\rho=0.81$, meta-analyses with 20 studies)


Mean square error (MSE)
Figure B-21. Mean squared error across 1000 simulated meta-analyses under various scenarios ( $\rho=0$, metaanalyses with 20 studies)

$$
\begin{gathered}
\rho=0.00 \\
\tau^{2}=0
\end{gathered}
$$


$\tau^{2}=0.1$

treatment effect

Figure B-22. Mean squared error across 1000 simulated meta-analyses under various scenarios ( $\rho=0.40$, meta-analyses with 20 studies)


Figure B-23. Mean squared error across 1000 simulated meta-analyses under various scenarios ( $\rho=0.59$, meta-analyses with 20 studies)


Figure B-24. Mean squared error across 1000 simulated meta-analyses under various scenarios ( $\rho=0.81$, meta-analyses with 20 studies)


## Complete Simulation Results

The tables in the following pages present the complete simulation results for each scenario assessed, three different meta-analysis sizes (5, 10, 20 studies), and using fixed and random effects methods.
In all tables MSE denotes mean square error; Tx is the treatment effect; $\rho$ is the correlation parameter; SS is the sample size; SSR is the sample size ratio; and $\mathrm{T}^{2}$ is the between-study heterogeneity parameter.

Simulation results: 5 studies per meta-analysis, fixed effect

| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=0$ | 0.0081 | 0.0091 | 0.0081 | 0.931 | 0.872 | 0.828 | 0.042 | 0.046 | 0.041 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=0$ | -0.0032 | -0.003 | -0.0011 | 0.934 | 0.925 | 0.922 | 0.026 | 0.026 | 0.026 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=0$ | 0.0021 | 0.0011 | 0.0017 | 0.95 | 0.959 | 0.966 | 0.016 | 0.016 | 0.016 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{t} 2=0$ | 0.0009 | 0.0037 | 0.0019 | 0.945 | 0.965 | 0.998 | 0.008 | 0.009 | 0.008 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0 | 0 | 0.0001 | 0.86 | 0.793 | 0.746 | 0.062 | 0.066 | 0.061 |
| Tx = 0; $\rho=0.40 ;$ SS =20; SSR =1; $22=.1$ | 0.0074 | 0.0068 | 0.0073 | 0.818 | 0.812 | 0.8 | 0.047 | 0.047 | 0.047 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0015 | 0.0011 | 0.0003 | 0.792 | 0.809 | 0.833 | 0.038 | 0.039 | 0.038 |
| Tx = 0; $\rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ \tau 2=.1$ | 0.0016 | -0.001 | 0.0039 | 0.647 | 0.746 | 0.899 | 0.028 | 0.034 | 0.028 |
| Tx = 0; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.005 | -0.0093 | -0.0073 | 0.677 | 0.592 | 0.522 | 0.148 | 0.158 | 0.147 |
| Tx = 0; $\rho=0.40 ; ~ S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0148 | 0.0128 | 0.0136 | 0.554 | 0.539 | 0.538 | 0.128 | 0.128 | 0.125 |
| Tx = 0; $\rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0141 | 0.0126 | 0.0128 | 0.554 | 0.581 | 0.615 | 0.116 | 0.116 | 0.114 |
| Tx = 0; $\rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ \tau 2=.5$ | -0.0061 | -0.0041 | -0.0035 | 0.372 | 0.464 | 0.588 | 0.107 | 0.127 | 0.107 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=0$ | -0.0082 | -0.01 | -0.0078 | 0.946 | 0.884 | 0.844 | 0.03 | 0.031 | 0.029 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=0$ | -0.0031 | -0.0041 | -0.0043 | 0.929 | 0.914 | 0.912 | 0.02 | 0.02 | 0.02 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0002 | -0.0004 | -0.0001 | 0.943 | 0.952 | 0.968 | 0.012 | 0.012 | 0.012 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0011 | 0.0014 | 0.0016 | 0.933 | 0.965 | 0.996 | 0.006 | 0.007 | 0.006 |
| Tx = 0; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0079 | 0.0081 | 0.0068 | 0.851 | 0.788 | 0.725 | 0.052 | 0.055 | 0.051 |
| Tx $=0 ; \rho=0.40 ; ~ S S=20 ; ~ S S R=2 ; ~ ז 2=.1$ | -0.0019 | -0.0028 | -0.0035 | 0.793 | 0.784 | 0.77 | 0.04 | 0.04 | 0.04 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; \tau 2=.1$ | -0.0043 | -0.0047 | -0.0058 | 0.727 | 0.756 | 0.788 | 0.036 | 0.035 | 0.035 |
| Tx = 0; $\rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0012 | 0.0003 | 0.0004 | 0.618 | 0.695 | 0.853 | 0.026 | 0.03 | 0.026 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.015 | 0.0161 | 0.0151 | 0.618 | 0.538 | 0.484 | 0.142 | 0.151 | 0.138 |
| Tx = 0; $\rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.003 | 0.0021 | 0.0029 | 0.541 | 0.53 | 0.524 | 0.117 | 0.116 | 0.116 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0121 | 0.0106 | 0.0107 | 0.467 | 0.464 | 0.512 | 0.116 | 0.118 | 0.115 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ 22=.5$ | -0.0015 | -0.0016 | -0.0044 | 0.314 | 0.394 | 0.509 | 0.114 | 0.129 | 0.115 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=0$ | 0.0022 | 0.0012 | 0.0018 | 0.934 | 0.861 | 0.803 | 0.017 | 0.019 | 0.017 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0022 | -0.0023 | -0.0015 | 0.948 | 0.937 | 0.932 | 0.009 | 0.009 | 0.009 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0027 | $-0.0027$ | -0.0027 | 0.945 | 0.955 | 0.971 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T}=0$ | 0.0033 | 0.004 | 0.0035 | 0.936 | 0.97 | 0.996 | 0.003 | 0.004 | 0.003 |
| Tx $=0 ; \rho=0.00 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | -0.0024 | -0.004 | -0.0028 | 0.805 | 0.718 | 0.671 | 0.037 | 0.04 | 0.036 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0039 | 0.0033 | 0.0026 | 0.735 | 0.712 | 0.699 | 0.03 | 0.029 | 0.029 |
| Tx = 0; $\rho=0.59 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0072 | 0.0084 | 0.0072 | 0.665 | 0.687 | 0.729 | 0.025 | 0.025 | 0.025 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0051 | -0.0114 | -0.0043 | 0.521 | 0.603 | 0.765 | 0.023 | 0.027 | 0.022 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0103 | $-0.0136$ | -0.0112 | 0.518 | 0.427 | 0.384 | 0.115 | 0.125 | 0.114 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0058 | 0.0063 | 0.0059 | 0.42 | 0.407 | 0.393 | 0.112 | 0.111 | 0.11 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; ~ S S R=1 ; ~ T 2=.5$ | 0.0041 | 0.0039 | 0.003 | 0.341 | 0.359 | 0.383 | 0.099 | 0.1 | 0.099 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0118 | 0.0078 | 0.0128 | 0.269 | 0.312 | 0.406 | 0.101 | 0.117 | 0.102 |
| Tx $=0 ; \rho=0.00 ; S S=50 ;$ SSR $=2 ; ~ T 2=0$ | 0.0026 | 0.0034 | 0.0029 | 0.931 | 0.875 | 0.813 | 0.013 | 0.014 | 0.013 |
| Tx $=0 ; \rho=0.40 ; S S=50 ;$ SSR $=2 ; ~ T 2=0$ | 0.0037 | 0.0038 | 0.0037 | 0.95 | 0.937 | 0.927 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=2 ; ~ \mathrm{~T} 2=0$ | 0.0001 | -0.0002 | -0.0002 | 0.954 | 0.962 | 0.968 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0017 | 0.0015 | 0.0021 | 0.949 | 0.972 | 0.998 | 0.002 | 0.003 | 0.002 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0093 | -0.009 | -0.0086 | 0.759 | 0.673 | 0.598 | 0.033 | 0.034 | 0.032 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0013 | 0.0011 | 0.0011 | 0.697 | 0.689 | 0.666 | 0.027 | 0.027 | 0.027 |
|  | -0.0016 | -0.003 | -0.0028 | 0.594 | 0.617 | 0.66 | 0.026 | 0.026 | 0.026 |
|  | 0.0006 | -0.0021 | 0.0011 | 0.462 | 0.529 | 0.68 | 0.024 | 0.028 | 0.024 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0042 | 0.0002 | 0.0058 | 0.454 | 0.387 | 0.329 | 0.12 | 0.131 | 0.118 |
| Tx $=0 ; \rho=0.40 ; S S=50 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0158 | 0.017 | 0.0173 | 0.366 | 0.353 | 0.342 | 0.108 | 0.108 | 0.108 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; ~ S S R=2 ; ~ T 2=.5$ | 0.0157 | 0.016 | 0.0141 | 0.316 | 0.337 | 0.359 | 0.112 | 0.115 | 0.112 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0028 | -0.0001 | 0.0056 | 0.236 | 0.254 | 0.361 | 0.104 | 0.124 | 0.104 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0029 | $-0.0037$ | -0.0026 | 0.945 | 0.891 | 0.827 | 0.008 | 0.009 | 0.008 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0002 | 0.0003 | 0.0003 | 0.959 | 0.934 | 0.931 | 0.004 | 0.005 | 0.004 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0004 | -0.0002 | -0.0005 | 0.952 | 0.958 | 0.971 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0015 | -0.0012 | -0.0016 | 0.946 | 0.975 | 0.998 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.004 | 0.0013 | 0.0038 | 0.714 | 0.62 | 0.556 | 0.028 | 0.03 | 0.028 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0031 | 0.0037 | 0.0034 | 0.587 | 0.565 | 0.557 | 0.025 | 0.025 | 0.025 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0077 | 0.0074 | 0.0078 | 0.53 | 0.56 | 0.569 | 0.024 | 0.024 | 0.024 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0055 | 0.0053 | 0.0061 | 0.387 | 0.444 | 0.615 | 0.022 | 0.025 | 0.022 |
| $\mathrm{Tx}=0 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0061 | 0.0012 | -0.0051 | 0.408 | 0.34 | 0.279 | 0.106 | 0.112 | 0.105 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0 | 0.0007 | 0.0001 | 0.333 | 0.321 | 0.311 | 0.104 | 0.104 | 0.103 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.013 | $-0.0136$ | -0.0143 | 0.271 | 0.28 | 0.302 | 0.11 | 0.111 | 0.11 |
| $\mathrm{Tx}=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0069 | 0.0087 | 0.0065 | 0.179 | 0.211 | 0.293 | 0.104 | 0.125 | 0.104 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=100 ;$ SSR =2; $22=0$ | -0.0001 | 0 | -0.0003 | 0.949 | 0.892 | 0.85 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.40 ; ~ S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0015 | 0.0013 | 0.0015 | 0.948 | 0.932 | 0.924 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}^{2}=0$ | -0.0011 | -0.0009 | -0.0012 | 0.949 | 0.956 | 0.968 | 0.002 | 0.003 | 0.002 |
| Tx $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0008 | 0.0003 | 0.0008 | 0.96 | 0.967 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0036 | 0.0033 | 0.0042 | 0.654 | 0.549 | 0.48 | 0.026 | 0.029 | 0.026 |
| Tx $=0 ; \rho=0.40 ; ~ S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0051 | 0.0047 | 0.0055 | 0.542 | 0.517 | 0.504 | 0.025 | 0.025 | 0.024 |
| $\mathrm{Tx}=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0025 | 0.0018 | 0.0013 | 0.475 | 0.5 | 0.521 | 0.024 | 0.024 | 0.024 |
| Tx $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.0007 | 0 | $-0.0013$ | 0.354 | 0.413 | 0.538 | 0.021 | 0.025 | 0.021 |
| Tx $=0 ; \rho=0.00 ; ~ S S=100 ; S S R=2 ; ~ T 2=.5$ | -0.0244 | -0.0227 | -0.0248 | 0.352 | 0.269 | 0.266 | 0.111 | 0.12 | 0.111 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0041 | -0.0034 | -0.0044 | 0.288 | 0.272 | 0.258 | 0.105 | 0.105 | 0.104 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.5$ | -0.0166 | -0.0169 | -0.0155 | 0.254 | 0.262 | 0.277 | 0.097 | 0.099 | 0.097 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0126 | 0.0125 | 0.0124 | 0.158 | 0.209 | 0.249 | 0.102 | 0.121 | 0.103 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0018 | -0.0042 | -0.002 | 0.93 | 0.871 | 0.821 | 0.043 | 0.045 | 0.042 |
| Tx = .1; $\rho=0.40 ; S S=20 ; S S R=1 ; ~ t 2=0$ | 0.0004 | 0.0016 | 0.0019 | 0.945 | 0.934 | 0.923 | 0.024 | 0.023 | 0.023 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0014 | 0.0015 | 0.0009 | 0.937 | 0.948 | 0.967 | 0.017 | 0.018 | 0.017 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0071 | 0.0057 | 0.0068 | 0.94 | 0.956 | 0.997 | 0.008 | 0.01 | 0.008 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0028 | 0.0002 | 0.0036 | 0.875 | 0.791 | 0.723 | 0.06 | 0.064 | 0.059 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0033 | 0.0027 | 0.0026 | 0.833 | 0.821 | 0.81 | 0.044 | 0.043 | 0.043 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0008 | 0.0002 | 0.0003 | 0.807 | 0.826 | 0.852 | 0.036 | 0.037 | 0.037 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0091 | $-0.0073$ | -0.0082 | 0.669 | 0.762 | 0.886 | 0.029 | 0.033 | 0.029 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0186 | -0.019 | -0.0176 | 0.686 | 0.604 | 0.526 | 0.153 | 0.161 | 0.146 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0002 | $-0.0013$ | -0.0043 | 0.6 | 0.565 | 0.56 | 0.124 | 0.124 | 0.123 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0137 | -0.0136 | -0.015 | 0.565 | 0.572 | 0.597 | 0.116 | 0.116 | 0.114 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0137 | -0.0102 | -0.0112 | 0.385 | 0.454 | 0.598 | 0.116 | 0.138 | 0.111 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.008 | 0.0077 | 0.0066 | 0.939 | 0.874 | 0.826 | 0.032 | 0.034 | 0.031 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t2}=0$ | -0.0031 | $-0.0034$ | -0.0035 | 0.929 | 0.923 | 0.919 | 0.019 | 0.018 | 0.018 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0038 | 0.0036 | 0.0056 | 0.937 | 0.941 | 0.956 | 0.013 | 0.014 | 0.013 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0014 | -0.0019 | -0.0022 | 0.94 | 0.96 | 0.999 | 0.006 | 0.007 | 0.006 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0032 | 0.0024 | 0.0035 | 0.857 | 0.768 | 0.725 | 0.051 | 0.056 | 0.049 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.003 | -0.0027 | -0.0021 | 0.783 | 0.768 | 0.757 | 0.043 | 0.042 | 0.042 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0014 | 0.0008 | 0.0007 | 0.763 | 0.781 | 0.825 | 0.032 | 0.032 | 0.031 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0023 | 0.0061 | 0.002 | 0.632 | 0.686 | 0.845 | 0.028 | 0.034 | 0.028 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0123$ | -0.0077 | -0.0094 | 0.628 | 0.535 | 0.491 | 0.141 | 0.155 | 0.138 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0084 | 0.0103 | 0.0107 | 0.541 | 0.522 | 0.506 | 0.114 | 0.115 | 0.116 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0198 | 0.0207 | 0.0214 | 0.474 | 0.483 | 0.526 | 0.12 | 0.121 | 0.12 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0106 | 0.0079 | 0.011 | 0.312 | 0.378 | 0.516 | 0.111 | 0.131 | 0.111 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0013 | -0.0007 | -0.0014 | 0.955 | 0.896 | 0.855 | 0.015 | 0.016 | 0.015 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0003 | 0.0003 | 0 | 0.958 | 0.944 | 0.942 | 0.009 | 0.009 | 0.009 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0061 | 0.0059 | 0.006 | 0.947 | 0.956 | 0.967 | 0.006 | 0.006 | 0.006 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0025 | -0.002 | -0.0022 | 0.954 | 0.973 | 0.997 | 0.003 | 0.004 | 0.003 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0019 | $-0.0018$ | 0.0019 | 0.798 | 0.695 | 0.643 | 0.036 | 0.039 | 0.036 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0037 | 0.0033 | 0.0043 | 0.726 | 0.704 | 0.695 | 0.029 | 0.029 | 0.029 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0058 | 0.0063 | 0.0064 | 0.667 | 0.682 | 0.727 | 0.026 | 0.026 | 0.025 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.001 | $-0.0011$ | 0.0006 | 0.514 | 0.587 | 0.732 | 0.024 | 0.028 | 0.024 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0003 | 0.0033 | -0.0016 | 0.516 | 0.428 | 0.375 | 0.119 | 0.134 | 0.118 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0058 | -0.0054 | -0.0049 | 0.422 | 0.401 | 0.393 | 0.109 | 0.11 | 0.109 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0005 | 0.0019 | -0.0018 | 0.372 | 0.37 | 0.4 | 0.108 | 0.11 | 0.108 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0217$ | -0.0112 | -0.0208 | 0.252 | 0.309 | 0.428 | 0.109 | 0.123 | 0.107 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t}^{2}=0$ | -0.0009 | $-0.0008$ | -0.0013 | 0.954 | 0.888 | 0.826 | 0.012 | 0.013 | 0.012 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0027 | -0.0022 | -0.0023 | 0.937 | 0.917 | 0.916 | 0.007 | 0.007 | 0.007 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0011 | $-0.0007$ | -0.0007 | 0.94 | 0.949 | 0.974 | 0.005 | 0.005 | 0.005 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0011 | 0.0014 | 0.0009 | 0.938 | 0.965 | 0.998 | 0.002 | 0.003 | 0.002 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.004 | $-0.0017$ | -0.003 | 0.74 | 0.642 | 0.574 | 0.035 | 0.038 | 0.035 |
| Tx = .1; $\rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0016 | 0.0013 | 0.0013 | 0.704 | 0.676 | 0.668 | 0.026 | 0.026 | 0.025 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0033 | 0.0023 | 0.0025 | 0.619 | 0.654 | 0.675 | 0.024 | 0.025 | 0.024 |
| Tx = .1; $\rho=0.81 ;$ SS =50; SSR $=2 ; ~ \mathrm{~T} 2=.1$ | -0.008 | -0.0079 | -0.0081 | 0.467 | 0.538 | 0.678 | 0.023 | 0.027 | 0.023 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0051 | -0.008 | -0.004 | 0.475 | 0.406 | 0.343 | 0.11 | 0.121 | 0.111 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0092 | 0.0099 | 0.0115 | 0.365 | 0.341 | 0.332 | 0.103 | 0.103 | 0.103 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0041 | 0.0049 | 0.008 | 0.339 | 0.353 | 0.357 | 0.103 | 0.105 | 0.103 |
| Tx = .1; $\rho=0.81 ;$ SS =50; SSR $=2 ; ~ \mathrm{~T} 2=.5$ | -0.0078 | -0.0046 | $-0.0073$ | 0.233 | 0.274 | 0.357 | 0.106 | 0.125 | 0.106 |
| $T x=.1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0001 | 0.001 | -0.0004 | 0.954 | 0.905 | 0.856 | 0.007 | 0.008 | 0.007 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0009 | 0.001 | 0.0012 | 0.943 | 0.927 | 0.916 | 0.005 | 0.005 | 0.005 |
| Tx $=.1 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0006 | -0.0006 | -0.0006 | 0.953 | 0.953 | 0.962 | 0.003 | 0.003 | 0.003 |
| Tx $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0003 | 0 | -0.0002 | 0.938 | 0.975 | 0.997 | 0.002 | 0.002 | 0.002 |
| Tx $=.1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0055 | $-0.0081$ | -0.0057 | 0.704 | 0.593 | 0.548 | 0.028 | 0.031 | 0.028 |
| $T x=.1 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0002 | 0.0003 | 0 | 0.615 | 0.593 | 0.576 | 0.024 | 0.024 | 0.024 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0092 | -0.0091 | -0.0095 | 0.547 | 0.555 | 0.599 | 0.022 | 0.023 | 0.023 |
| Tx $=.1 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0043 | $-0.0014$ | -0.0045 | 0.37 | 0.439 | 0.563 | 0.024 | 0.027 | 0.024 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0074 | 0.0096 | 0.0076 | 0.397 | 0.344 | 0.295 | 0.111 | 0.122 | 0.111 |
| $T x=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0012 | -0.0022 | -0.003 | 0.324 | 0.319 | 0.3 | 0.101 | 0.102 | 0.101 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0058 | 0.0067 | 0.006 | 0.266 | 0.279 | 0.291 | 0.107 | 0.108 | 0.106 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0036 | -0.0162 | -0.0033 | 0.164 | 0.215 | 0.282 | 0.107 | 0.133 | 0.108 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}_{2}=0$ | 0.0039 | 0.0033 | 0.0039 | 0.942 | 0.891 | 0.86 | 0.006 | 0.006 | 0.006 |
| $T x=1 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ t 2=0$ | -0.0018 | -0.0017 | -0.0019 | 0.954 | 0.953 | 0.937 | 0.003 | 0.003 | 0.003 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0009 | -0.001 | -0.001 | 0.947 | 0.956 | 0.97 | 0.002 | 0.002 | 0.002 |
| $T x=1 ; \rho=0.81 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0021 | 0.0018 | 0.0021 | 0.946 | 0.972 | 1 | 0.001 | 0.001 | 0.001 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0088 | 0.0111 | 0.0088 | 0.654 | 0.559 | 0.504 | 0.026 | 0.029 | 0.026 |
| $T x=.1 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ t 2=.1$ | -0.0003 | -0.0001 | -0.0004 | 0.544 | 0.527 | 0.508 | 0.023 | 0.023 | 0.023 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0008 | 0.0013 | 0.0008 | 0.472 | 0.48 | 0.523 | 0.024 | 0.024 | 0.024 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | 0.0006 | 0.0057 | 0.0007 | 0.342 | 0.396 | 0.532 | 0.022 | 0.026 | 0.022 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0083 | 0.0073 | 0.0076 | 0.369 | 0.311 | 0.263 | 0.103 | 0.113 | 0.103 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0026 | -0.0023 | -0.0025 | 0.263 | 0.257 | 0.246 | 0.099 | 0.098 | 0.098 |
| $T x=.1 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.002 | 0.0036 | 0.0021 | 0.221 | 0.243 | 0.248 | 0.117 | 0.117 | 0.116 |
| Tx $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t2}=.5$ | -0.0041 | -0.0046 | -0.0042 | 0.176 | 0.191 | 0.266 | 0.103 | 0.12 | 0.103 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0002 | -0.0051 | -0.0015 | 0.938 | 0.893 | 0.833 | 0.042 | 0.045 | 0.042 |
| Tx = . $; ~ \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0087 | -0.0087 | -0.0087 | 0.935 | 0.917 | 0.918 | 0.026 | 0.026 | 0.025 |
| Tx = . $; ~ \rho=0.59 ; S S=20 ; S S R=1 ; ~ t 2=0$ | 0.0036 | 0.0037 | 0.003 | 0.93 | 0.944 | 0.965 | 0.018 | 0.018 | 0.018 |
| Tx $=.5 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ t 2=0$ | -0.0013 | -0.002 | -0.0015 | 0.943 | 0.967 | 0.999 | 0.008 | 0.009 | 0.008 |
| Tx = . $5 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.009 | 0.0046 | 0.0092 | 0.873 | 0.802 | 0.753 | 0.061 | 0.064 | 0.059 |
| Tx = . $5 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0011 | 0.0001 | 0.0007 | 0.835 | 0.818 | 0.809 | 0.047 | 0.046 | 0.046 |
| Tx = . $5 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0002 | 0.0003 | 0.0016 | 0.787 | 0.801 | 0.856 | 0.037 | 0.037 | 0.036 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0006 | -0.0012 | 0.0013 | 0.677 | 0.757 | 0.885 | 0.029 | 0.034 | 0.029 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0048 | 0.0073 | 0.0064 | 0.686 | 0.603 | 0.546 | 0.15 | 0.156 | 0.147 |
| Tx = . $5 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0079 | -0.0085 | -0.0092 | 0.59 | 0.568 | 0.567 | 0.126 | 0.124 | 0.124 |
| Tx = . $5 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0008 | -0.0001 | -0.0004 | 0.508 | 0.52 | 0.563 | 0.121 | 0.122 | 0.121 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=20 ; ~ S S R=1 ; ~ 72=.5$ | -0.0104 | -0.0117 | -0.0026 | 0.389 | 0.463 | 0.606 | 0.115 | 0.139 | 0.113 |
| Tx $=.5 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0016 | 0.0038 | 0.0016 | 0.938 | 0.873 | 0.82 | 0.033 | 0.035 | 0.032 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0022 | -0.0014 | -0.002 | 0.936 | 0.931 | 0.924 | 0.02 | 0.019 | 0.019 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.002 | -0.0014 | -0.0002 | 0.939 | 0.942 | 0.96 | 0.013 | 0.014 | 0.013 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0006 | 0.0018 | 0.0017 | 0.931 | 0.97 | 1 | 0.006 | 0.007 | 0.006 |
| Tx = . $5 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0044 | 0.0073 | 0.0057 | 0.84 | 0.758 | 0.704 | 0.054 | 0.057 | 0.053 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% <br> incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0083$ | -0.0081 | -0.0097 | 0.801 | 0.783 | 0.765 | 0.04 | 0.041 | 0.041 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0092$ | -0.0077 | -0.0071 | 0.763 | 0.78 | 0.812 | 0.034 | 0.034 | 0.033 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0032 | -0.0023 | -0.0039 | 0.618 | 0.705 | 0.846 | 0.028 | 0.032 | 0.027 |
| Tx $=.5 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0033 | 0.0104 | 0.006 | 0.628 | 0.526 | 0.486 | 0.139 | 0.148 | 0.136 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0055 | -0.0034 | -0.0023 | 0.541 | 0.527 | 0.513 | 0.125 | 0.124 | 0.122 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0061 | -0.0054 | -0.0042 | 0.443 | 0.461 | 0.49 | 0.125 | 0.124 | 0.123 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0005 | 0.0007 | 0.0003 | 0.34 | 0.395 | 0.533 | 0.112 | 0.136 | 0.113 |
| Tx = . $; ~ \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0035 | 0.0031 | 0.0027 | 0.94 | 0.906 | 0.859 | 0.015 | 0.016 | 0.015 |
| Tx $=.5 ; \rho=0.40 ;$ SS =50; SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0019 | 0.0025 | 0.0024 | 0.939 | 0.92 | 0.918 | 0.01 | 0.01 | 0.01 |
| Tx $=.5 ; \rho=0.59 ;$ SS =50; SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0008 | 0.0011 | 0.0007 | 0.939 | 0.951 | 0.966 | 0.007 | 0.007 | 0.007 |
| Tx $=.5 ; \rho=0.81 ;$ SS =50; SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0017 | -0.0022 | -0.0019 | 0.951 | 0.971 | 0.999 | 0.003 | 0.004 | 0.003 |
| Tx $=.5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0094 | $-0.0066$ | -0.01 | 0.797 | 0.694 | 0.64 | 0.035 | 0.039 | 0.035 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0024 | 0.0013 | 0.0011 | 0.721 | 0.699 | 0.683 | 0.03 | 0.03 | 0.03 |
| Tx $=.5 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ \mathrm{~T}=.1$ | -0.0008 | -0.0016 | -0.0016 | 0.63 | 0.653 | 0.687 | 0.029 | 0.029 | 0.028 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0079 | -0.0055 | -0.008 | 0.52 | 0.604 | 0.755 | 0.023 | 0.026 | 0.023 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0019 | 0.005 | -0.0015 | 0.532 | 0.443 | 0.394 | 0.113 | 0.125 | 0.112 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0096 | -0.0085 | -0.0076 | 0.449 | 0.428 | 0.416 | 0.11 | 0.108 | 0.11 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0023 | 0.0028 | 0.0012 | 0.362 | 0.364 | 0.396 | 0.104 | 0.105 | 0.102 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0185$ | -0.0155 | -0.0171 | 0.275 | 0.307 | 0.435 | 0.104 | 0.122 | 0.104 |
| Tx $=.5 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0034 | 0.0026 | 0.0027 | 0.943 | 0.873 | 0.824 | 0.013 | 0.013 | 0.012 |
| Tx $=.5 ; \rho=0.40 ;$ SS =50; SSR $=2 ; ~ \mathrm{~T} 2=0$ | 0.0022 | 0.0019 | 0.0017 | 0.943 | 0.936 | 0.932 | 0.007 | 0.007 | 0.007 |
| Tx $=.5 ; \rho=0.59 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=0$ | 0.0015 | 0.0011 | 0.0017 | 0.958 | 0.967 | 0.977 | 0.005 | 0.005 | 0.005 |
| Tx = . $; ~ \rho=0.81 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=0$ | 0.0027 | 0.0025 | 0.0025 | 0.951 | 0.97 | 0.998 | 0.002 | 0.003 | 0.002 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0002 | 0.0009 | 0.0006 | 0.779 | 0.682 | 0.596 | 0.031 | 0.034 | 0.031 |
| Tx $=.5 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.1$ | $-0.0088$ | -0.0082 | -0.0078 | 0.669 | 0.65 | 0.642 | 0.029 | 0.029 | 0.029 |
| Tx $=.5 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0005 | -0.0009 | -0.0003 | 0.63 | 0.657 | 0.683 | 0.023 | 0.023 | 0.023 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0012 | 0.002 | 0.002 | 0.466 | 0.537 | 0.686 | 0.023 | 0.028 | 0.023 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% <br> incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = . $; ~ \rho=0.00 ; S S=50 ; S S R=2 ; ~ t 2=.5$ | $-0.0062$ | -0.0094 | -0.0062 | 0.467 | 0.382 | 0.339 | 0.12 | 0.13 | 0.119 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t2}=.5$ | $-0.0085$ | -0.0079 | -0.0084 | 0.361 | 0.356 | 0.342 | 0.108 | 0.107 | 0.107 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.5$ | -0.0025 | -0.0034 | -0.0025 | 0.347 | 0.357 | 0.385 | 0.102 | 0.102 | 0.101 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ t 2=.5$ | -0.0062 | -0.0095 | -0.0087 | 0.219 | 0.248 | 0.339 | 0.108 | 0.126 | 0.107 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | -0.0005 | 0.0001 | -0.0004 | 0.949 | 0.869 | 0.823 | 0.008 | 0.009 | 0.008 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0016 | 0.0019 | 0.002 | 0.941 | 0.933 | 0.921 | 0.005 | 0.005 | 0.005 |
| Tx = .5; $\rho=0.59 ;$ SS =100; SSR $=1 ; ~ \mathrm{~T} 2=0$ | $-0.0027$ | -0.0028 | -0.003 | 0.931 | 0.945 | 0.957 | 0.004 | 0.004 | 0.004 |
| Tx = .5; $\rho=0.81 ;$ SS =100; SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0028 | -0.0028 | -0.0026 | 0.95 | 0.975 | 1 | 0.002 | 0.002 | 0.002 |
| Tx = . $; ~ \rho=0.00 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0009 | -0.0001 | -0.0013 | 0.707 | 0.622 | 0.538 | 0.028 | 0.031 | 0.028 |
| Tx = .5; $\rho=0.40 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0006 | -0.0005 | -0.0017 | 0.613 | 0.59 | 0.581 | 0.024 | 0.024 | 0.024 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0025 | 0.0028 | 0.0014 | 0.544 | 0.559 | 0.581 | 0.024 | 0.025 | 0.024 |
| Tx = .5; $\rho=0.81 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | $-0.0069$ | -0.0071 | -0.006 | 0.446 | 0.485 | 0.639 | 0.021 | 0.025 | 0.021 |
| Tx $=.5 ; \rho=0.00 ;$ SS $=100 ; S S R=1 ; ~ \mathrm{~T}=.5$ | 0.0066 | 0.005 | 0.0069 | 0.425 | 0.355 | 0.309 | 0.109 | 0.118 | 0.109 |
| Tx = .5; $\rho=0.40 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0069 | 0.0071 | 0.0074 | 0.326 | 0.308 | 0.298 | 0.107 | 0.107 | 0.106 |
| Tx = .5; $\rho=0.59 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0065 | -0.0041 | -0.0056 | 0.27 | 0.288 | 0.309 | 0.104 | 0.105 | 0.105 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | 0.0003 | -0.0053 | -0.0003 | 0.177 | 0.228 | 0.301 | 0.103 | 0.123 | 0.104 |
| Tx = .5; $\rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=0$ | 0.003 | 0.0034 | 0.0029 | 0.949 | 0.874 | 0.832 | 0.006 | 0.007 | 0.006 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | $-0.0023$ | -0.0024 | -0.0025 | 0.946 | 0.925 | 0.916 | 0.004 | 0.004 | 0.004 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | $-0.0026$ | -0.0028 | -0.0026 | 0.935 | 0.942 | 0.958 | 0.003 | 0.003 | 0.003 |
| Tx = .5; $\rho=0.81 ;$ SS = 100; SSR $=2 ; ~ \mathrm{~T} 2=0$ | 0.0023 | 0.0022 | 0.0023 | 0.947 | 0.973 | 0.997 | 0.001 | 0.001 | 0.001 |
| Tx = .5; $\rho=0.00 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=.1$ | 0.0003 | -0.0008 | 0.0005 | 0.647 | 0.544 | 0.483 | 0.028 | 0.03 | 0.028 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | -0.0062 | -0.0058 | -0.0059 | 0.571 | 0.548 | 0.542 | 0.023 | 0.023 | 0.022 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0097 | 0.0097 | 0.0097 | 0.503 | 0.526 | 0.554 | 0.021 | 0.022 | 0.021 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0019 | -0.001 | 0.0023 | 0.351 | 0.402 | 0.542 | 0.021 | 0.025 | 0.021 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.5$ | $-0.0123$ | -0.0075 | -0.0118 | 0.338 | 0.281 | 0.249 | 0.115 | 0.123 | 0.114 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0116 | 0.0122 | 0.0121 | 0.301 | 0.29 | 0.279 | 0.107 | 0.106 | 0.107 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.5$ | 0.0001 | 0.0006 | 0.0014 | 0.238 | 0.244 | 0.257 | 0.106 | 0.107 | 0.106 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{x}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.5$ | -0.0008 | -0.0007 | 0.0005 | 0.169 | 0.195 | 0.261 | 0.099 | 0.114 | 0.099 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0157 | -0.0151 | -0.0149 | 0.924 | 0.871 | 0.821 | 0.043 | 0.048 | 0.042 |
| Tx $=1 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T}=0$ | 0.0009 | -0.0004 | -0.0008 | 0.948 | 0.938 | 0.935 | 0.025 | 0.024 | 0.024 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0043 | 0.0059 | 0.0057 | 0.935 | 0.947 | 0.962 | 0.018 | 0.018 | 0.018 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T}=0$ | 0.0022 | 0.0018 | 0.0028 | 0.941 | 0.969 | 0.996 | 0.008 | 0.01 | 0.008 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0067 | -0.0101 | -0.0048 | 0.864 | 0.756 | 0.713 | 0.067 | 0.073 | 0.066 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0096 | -0.0092 | -0.0108 | 0.832 | 0.812 | 0.805 | 0.046 | 0.046 | 0.046 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0009 | 0.0005 | 0.0011 | 0.797 | 0.814 | 0.836 | 0.037 | 0.037 | 0.037 |
| Tx = 1; $\rho=0.81 ;$ SS $=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0023 | -0.0013 | -0.0009 | 0.674 | 0.736 | 0.891 | 0.029 | 0.035 | 0.029 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0075 | 0.0091 | 0.0072 | 0.686 | 0.604 | 0.526 | 0.15 | 0.158 | 0.147 |
| Tx = 1; $\rho=0.40 ;$ SS =20; SSR =1; $\mathrm{T} 2=.5$ | -0.0064 | -0.0037 | -0.0016 | 0.573 | 0.533 | 0.542 | 0.132 | 0.131 | 0.128 |
| Tx = 1; $\rho=0.59 ;$ SS =20; SSR =1; $\mathrm{T} 2=.5$ | -0.008 | -0.0107 | -0.0071 | 0.519 | 0.545 | 0.587 | 0.114 | 0.114 | 0.111 |
| Tx = 1; $\rho=0.81 ;$ SS =20; SSR $=1 ; ~ T 2=.5$ | 0.016 | 0.0165 | 0.0146 | 0.361 | 0.458 | 0.587 | 0.115 | 0.134 | 0.115 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0105 | 0.0102 | 0.0089 | 0.937 | 0.865 | 0.82 | 0.034 | 0.037 | 0.033 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.006 | 0.0054 | 0.0058 | 0.937 | 0.919 | 0.921 | 0.019 | 0.019 | 0.019 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0011 | -0.0014 | -0.0002 | 0.922 | 0.932 | 0.95 | 0.014 | 0.014 | 0.014 |
|  | -0.0043 | -0.0052 | -0.0041 | 0.924 | 0.959 | 0.995 | 0.007 | 0.008 | 0.006 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0042 | 0.0021 | 0.0044 | 0.841 | 0.777 | 0.709 | 0.053 | 0.056 | 0.052 |
| Tx = 1; $\rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0072 | 0.0077 | 0.0094 | 0.807 | 0.786 | 0.779 | 0.039 | 0.039 | 0.039 |
| Tx = 1; $\rho=0.59 ;$ SS =20; SSR $=2 ; ~ T 2=.1$ | -0.0062 | -0.0055 | -0.005 | 0.741 | 0.762 | 0.799 | 0.036 | 0.036 | 0.035 |
| Tx = 1; $\rho=0.81 ;$ SS =20; SSR =2; $\mathrm{T} 2=.1$ | -0.0076 | -0.0111 | -0.0081 | 0.632 | 0.696 | 0.852 | 0.028 | 0.033 | 0.028 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0157 | 0.018 | 0.0161 | 0.638 | 0.552 | 0.502 | 0.123 | 0.13 | 0.12 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0066$ | -0.0057 | -0.0054 | 0.563 | 0.543 | 0.523 | 0.116 | 0.116 | 0.114 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0135 | 0.0122 | 0.0164 | 0.46 | 0.467 | 0.502 | 0.121 | 0.12 | 0.119 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0014 | -0.0005 | -0.005 | 0.333 | 0.373 | 0.521 | 0.12 | 0.141 | 0.114 |
| TX $=1 ; \rho=0.00 ; S S=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0025 | -0.0035 | -0.0026 | 0.95 | 0.879 | 0.82 | 0.016 | 0.018 | 0.016 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0009 | -0.0006 | -0.0005 | 0.951 | 0.94 | 0.934 | 0.009 | 0.009 | 0.009 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=1 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0006 | 0.0008 | 0.0009 | 0.963 | 0.964 | 0.976 | 0.006 | 0.006 | 0.006 |
| TX $=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0013 | 0.0013 | 0.0007 | 0.943 | 0.978 | 1 | 0.003 | 0.004 | 0.003 |
| Tx = 1; $\rho=0.00 ;$ SS = 0 ; SSR $=1 ; ~ T 2=.1$ | -0.0066 | -0.0048 | -0.0055 | 0.8 | 0.711 | 0.635 | 0.036 | 0.04 | 0.036 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0 | 0 | -0.0011 | 0.715 | 0.689 | 0.675 | 0.032 | 0.032 | 0.031 |
| Tx = 1; $\rho=0.59 ;$ SS =50; SSR =1; T2 = . 1 | -0.0009 | -0.0016 | -0.0016 | 0.678 | 0.686 | 0.716 | 0.026 | 0.027 | 0.027 |
| Tx = 1; $\rho=0.81 ;$ SS =50; SSR =1; $\mathrm{T} 2=.1$ | -0.0099 | -0.0123 | -0.0094 | 0.567 | 0.634 | 0.774 | 0.021 | 0.025 | 0.022 |
| Tx = 1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0125 | 0.015 | 0.0138 | 0.536 | 0.461 | 0.407 | 0.112 | 0.124 | 0.112 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0109 | 0.0093 | 0.0094 | 0.417 | 0.387 | 0.378 | 0.112 | 0.111 | 0.111 |
| Tx = 1; $\rho=0.59 ; S S=50 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0027 | 0.0024 | 0.0037 | 0.335 | 0.361 | 0.38 | 0.118 | 0.119 | 0.117 |
| Tx = 1; $\rho=0.81 ;$ SS =50; SSR =1; $\mathrm{T} 2=.5$ | -0.016 | -0.0173 | -0.0153 | 0.265 | 0.313 | 0.436 | 0.102 | 0.118 | 0.102 |
| Tx = 1; $\rho=0.00 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=0$ | -0.0005 | 0 | -0.0003 | 0.94 | 0.873 | 0.813 | 0.013 | 0.014 | 0.013 |
| Tx = 1; $\rho=0.40 ;$ SS =50; SSR $=2 ; ~ \mathrm{~T} 2=0$ | -0.0002 | 0 | 0.0002 | 0.949 | 0.942 | 0.935 | 0.007 | 0.007 | 0.007 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0013 | $-0.0014$ | -0.0014 | 0.938 | 0.948 | 0.963 | 0.005 | 0.005 | 0.005 |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=0$ | 0.0017 | 0.0028 | 0.0019 | 0.946 | 0.979 | 0.996 | 0.002 | 0.003 | 0.002 |
| Tx = 1; $\rho=0.00 ; S S=50 ;$ SSR $=2 ; ~ T 2=.1$ | -0.004 | -0.0052 | -0.0042 | 0.784 | 0.688 | 0.634 | 0.031 | 0.034 | 0.031 |
| Tx = 1; $\rho=0.40 ;$ SS =50; SSR =2; $\mathrm{T} 2=.1$ | -0.0059 | -0.0063 | -0.0061 | 0.682 | 0.645 | 0.635 | 0.028 | 0.028 | 0.028 |
| Tx = 1; $\rho=0.59 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=.1$ | -0.0028 | -0.0019 | -0.0017 | 0.584 | 0.605 | 0.648 | 0.028 | 0.028 | 0.028 |
| Tx = 1; $\rho=0.81 ;$ SS =50; SSR $=2 ; ~ \mathrm{~T} 2=.1$ | 0.0005 | 0.0009 | 0.0005 | 0.457 | 0.507 | 0.68 | 0.023 | 0.028 | 0.023 |
| Tx $=1 ; \rho=0.00 ; S S=50 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0037 | 0.0072 | 0.0024 | 0.454 | 0.381 | 0.341 | 0.12 | 0.132 | 0.119 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0003 | -0.0002 | -0.0012 | 0.383 | 0.365 | 0.347 | 0.109 | 0.11 | 0.108 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0016 | 0.0028 | 0.0039 | 0.343 | 0.331 | 0.357 | 0.112 | 0.112 | 0.111 |
| Tx = 1; $\rho=0.81 ;$ SS = 50; SSR =2; $\mathrm{T} 2=.5$ | -0.003 | -0.0026 | -0.0028 | 0.197 | 0.253 | 0.331 | 0.112 | 0.132 | 0.111 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | $-0.0037$ | -0.0045 | $-0.0038$ | 0.946 | 0.881 | 0.84 | 0.008 | 0.009 | 0.008 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ; S S R=1 ; ~ T 2=0$ | $-0.0017$ | -0.0018 | -0.0017 | 0.948 | 0.932 | 0.924 | 0.005 | 0.005 | 0.005 |
| Tx $=1 ; \rho=0.59 ;$ SS $=100 ; S S R=1 ; ~ T 2=0$ | 0.0021 | 0.002 | 0.0024 | 0.948 | 0.954 | 0.97 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0015 | -0.0012 | -0.0016 | 0.951 | 0.974 | 0.997 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | $-0.0028$ | $-0.0011$ | -0.003 | 0.731 | 0.627 | 0.558 | 0.027 | 0.03 | 0.027 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.004 | 0.0046 | 0.0039 | 0.631 | 0.616 | 0.598 | 0.023 | 0.023 | 0.023 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0044 | $-0.0038$ | -0.0039 | 0.53 | 0.542 | 0.579 | 0.024 | 0.024 | 0.024 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.001 | -0.0004 | -0.0003 | 0.363 | 0.448 | 0.567 | 0.023 | 0.026 | 0.023 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0004$ | 0.0016 | -0.0003 | 0.411 | 0.346 | 0.294 | 0.11 | 0.123 | 0.109 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0269 | 0.0272 | 0.0274 | 0.326 | 0.309 | 0.295 | 0.106 | 0.106 | 0.105 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0286 | -0.0284 | -0.0274 | 0.271 | 0.282 | 0.29 | 0.104 | 0.104 | 0.103 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0035 | -0.004 | -0.0036 | 0.199 | 0.232 | 0.306 | 0.107 | 0.123 | 0.107 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ;$ SSR =2; $22=0$ | -0.0003 | -0.0006 | -0.0004 | 0.945 | 0.872 | 0.819 | 0.006 | 0.007 | 0.006 |
| Tx = 1; $\rho=0.40 ;$ SS = 100; SSR =2; $22=0$ | 0.0011 | 0.001 | 0.001 | 0.962 | 0.95 | 0.938 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | 0 | -0.0002 | -0.0001 | 0.952 | 0.96 | 0.967 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.81 ;$ SS = 100; SSR =2; $72=0$ | -0.0009 | -0.0016 | -0.0009 | 0.941 | 0.968 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0076 | 0.0065 | 0.0073 | 0.67 | 0.575 | 0.524 | 0.025 | 0.027 | 0.025 |
| Tx = 1; $\rho=0.40 ;$ SS = 100; SSR =2; $22=.1$ | 0.0035 | 0.0032 | 0.0038 | 0.551 | 0.53 | 0.527 | 0.023 | 0.024 | 0.023 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0043 | -0.0039 | -0.0041 | 0.47 | 0.474 | 0.508 | 0.023 | 0.023 | 0.023 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0013 | 0.0015 | 0.002 | 0.348 | 0.395 | 0.535 | 0.021 | 0.026 | 0.021 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0113 | 0.0103 | 0.0116 | 0.332 | 0.268 | 0.233 | 0.119 | 0.128 | 0.118 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0046 | 0.0062 | 0.0064 | 0.276 | 0.262 | 0.255 | 0.109 | 0.109 | 0.108 |
| Tx = 1; $\rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | -0.018 | -0.0179 | -0.0184 | 0.25 | 0.256 | 0.262 | 0.109 | 0.109 | 0.108 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0065 | 0.0053 | 0.0077 | 0.16 | 0.186 | 0.241 | 0.103 | 0.123 | 0.103 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0035 | -0.0032 | -0.0023 | 0.949 | 0.895 | 0.866 | 0.049 | 0.051 | 0.049 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0106 | 0.0099 | 0.0085 | 0.927 | 0.913 | 0.901 | 0.036 | 0.035 | 0.035 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0043 | 0.0055 | 0.0062 | 0.936 | 0.953 | 0.969 | 0.023 | 0.023 | 0.022 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T}=0$ | 0.0058 | 0.0063 | 0.0067 | 0.932 | 0.959 | 0.994 | 0.012 | 0.014 | 0.012 |
| Tx $=0 ; \rho=0.00 ; ~ S S=20 ; ~ S S R=1 ; ~ T 2=.1$ | 0.0064 | 0.0098 | 0.0093 | 0.885 | 0.797 | 0.759 | 0.078 | 0.085 | 0.078 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | 0.0103 | 0.0099 | 0.0108 | 0.855 | 0.849 | 0.843 | 0.052 | 0.051 | 0.051 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0107 | -0.011 | -0.0115 | 0.811 | 0.834 | 0.862 | 0.047 | 0.046 | 0.045 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0041 | 0.0073 | 0.0047 | 0.72 | 0.793 | 0.904 | 0.034 | 0.038 | 0.033 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% <br> incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0187 | 0.0116 | 0.0147 | 0.72 | 0.643 | 0.59 | 0.157 | 0.165 | 0.151 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.029 | 0.0256 | 0.027 | 0.631 | 0.618 | 0.617 | 0.146 | 0.144 | 0.144 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0131 | 0.0108 | 0.0141 | 0.596 | 0.621 | 0.66 | 0.124 | 0.126 | 0.122 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0039 | 0.0073 | 0.004 | 0.406 | 0.514 | 0.638 | 0.12 | 0.137 | 0.118 |
| Tx $=0 ; \rho=0.00 ; S S=20 ;$ SSR $=2 ; ~ T 2=0$ | 0.0068 | 0.0043 | 0.006 | 0.946 | 0.89 | 0.851 | 0.034 | 0.037 | 0.033 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | $-0.0035$ | -0.0051 | -0.0051 | 0.941 | 0.938 | 0.921 | 0.022 | 0.022 | 0.022 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | -0.0002 | 0.0007 | -0.0004 | 0.945 | 0.957 | 0.975 | 0.014 | 0.015 | 0.014 |
|  | 0.0005 | 0.0018 | -0.0001 | 0.933 | 0.972 | 0.997 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; ~ S S R=2 ; ~ T 2=.1$ | -0.0115 | -0.0107 | -0.0116 | 0.862 | 0.793 | 0.738 | 0.058 | 0.062 | 0.056 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0007 | -0.0008 | -0.0011 | 0.826 | 0.812 | 0.799 | 0.04 | 0.039 | 0.039 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0004 | -0.0013 | -0.0036 | 0.748 | 0.768 | 0.803 | 0.042 | 0.042 | 0.041 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0039 | $-0.0036$ | -0.004 | 0.675 | 0.759 | 0.894 | 0.028 | 0.031 | 0.028 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0034 | 0.0016 | 0.0033 | 0.683 | 0.579 | 0.528 | 0.139 | 0.156 | 0.137 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0068 | -0.0072 | -0.0053 | 0.575 | 0.557 | 0.547 | 0.125 | 0.123 | 0.122 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0088 | 0.0097 | 0.0089 | 0.514 | 0.513 | 0.554 | 0.114 | 0.115 | 0.114 |
|  | 0.0102 | 0.011 | 0.0103 | 0.385 | 0.417 | 0.563 | 0.117 | 0.131 | 0.113 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; ~ S S R=1 ; ~ T 2=0$ | -0.0003 | -0.0017 | 0.0001 | 0.95 | 0.903 | 0.838 | 0.02 | 0.021 | 0.019 |
| Tx $=0 ; \rho=0.40 ; S S=50 ;$ SSR $=1 ; ~ T 2=0$ | -0.0073 | -0.0065 | -0.0065 | 0.939 | 0.93 | 0.922 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; ~ S S R=1 ; ~ T 2=0$ | 0.0057 | 0.0056 | 0.0052 | 0.946 | 0.954 | 0.969 | 0.009 | 0.009 | 0.009 |
| Tx $=0 ; \rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=0$ | -0.0029 | -0.0021 | -0.003 | 0.943 | 0.98 | 0.998 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0028 | 0.0013 | -0.003 | 0.818 | 0.749 | 0.69 | 0.041 | 0.044 | 0.04 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0092 | -0.0084 | -0.0087 | 0.74 | 0.718 | 0.721 | 0.035 | 0.034 | 0.034 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0044 | 0.0059 | 0.0058 | 0.709 | 0.718 | 0.75 | 0.029 | 0.03 | 0.029 |
| Tx $=0 ; \rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | 0.0028 | 0.0026 | 0.0029 | 0.575 | 0.663 | 0.781 | 0.026 | 0.029 | 0.026 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0086 | 0.0087 | 0.0074 | 0.58 | 0.489 | 0.441 | 0.113 | 0.122 | 0.112 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0138 | 0.014 | 0.0149 | 0.475 | 0.454 | 0.443 | 0.115 | 0.115 | 0.114 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0118 | 0.0108 | 0.0102 | 0.42 | 0.443 | 0.473 | 0.1 | 0.101 | 0.099 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% <br> incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T}=.5$ | $-0.0083$ | -0.0087 | -0.007 | 0.307 | 0.349 | 0.46 | 0.106 | 0.122 | 0.105 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0049 | 0.0069 | 0.0045 | 0.944 | 0.874 | 0.843 | 0.015 | 0.016 | 0.015 |
| Tx $=0 ; \rho=0.40 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=0$ | 0.0001 | 0 | -0.0003 | 0.951 | 0.934 | 0.929 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.59 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=0$ | 0.004 | 0.0042 | 0.0035 | 0.936 | 0.949 | 0.965 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0026 | -0.003 | -0.0027 | 0.937 | 0.968 | 0.999 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.00 ; S S=50 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0036 | 0.0008 | 0.0033 | 0.796 | 0.694 | 0.628 | 0.034 | 0.037 | 0.034 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0014 | 0.0019 | 0.0021 | 0.695 | 0.663 | 0.662 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0075 | -0.0079 | -0.0064 | 0.655 | 0.675 | 0.705 | 0.025 | 0.025 | 0.025 |
|  | -0.004 | -0.0027 | -0.0036 | 0.532 | 0.558 | 0.719 | 0.024 | 0.029 | 0.024 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0181 | -0.0195 | -0.0175 | 0.507 | 0.431 | 0.376 | 0.111 | 0.121 | 0.11 |
| Tx $=0 ; \rho=0.40 ; S S=50 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0097 | -0.0078 | -0.009 | 0.406 | 0.383 | 0.365 | 0.105 | 0.106 | 0.106 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.5$ | -0.0026 | -0.0035 | 0.0008 | 0.341 | 0.358 | 0.367 | 0.11 | 0.111 | 0.11 |
|  | -0.0044 | -0.015 | $-0.0063$ | 0.242 | 0.297 | 0.39 | 0.109 | 0.123 | 0.108 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0018 | -0.0026 | -0.0018 | 0.949 | 0.892 | 0.846 | 0.01 | 0.011 | 0.01 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.002 | 0.0021 | 0.0018 | 0.957 | 0.949 | 0.948 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0021 | 0.0022 | 0.0018 | 0.945 | 0.961 | 0.968 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0 | 0 | 0.0001 | 0.949 | 0.979 | 0.999 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0033 | 0.0055 | 0.003 | 0.729 | 0.651 | 0.581 | 0.031 | 0.032 | 0.031 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.001 | 0.0003 | -0.0006 | 0.667 | 0.648 | 0.633 | 0.025 | 0.025 | 0.025 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0 | -0.0008 | -0.0009 | 0.566 | 0.583 | 0.628 | 0.025 | 0.026 | 0.025 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ; S S R=1 ; ~ T 2=.1$ | -0.0042 | -0.0052 | -0.0042 | 0.487 | 0.535 | 0.675 | 0.022 | 0.025 | 0.022 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0138 | 0.0104 | 0.0127 | 0.443 | 0.368 | 0.324 | 0.116 | 0.124 | 0.115 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0112 | -0.0113 | -0.0119 | 0.368 | 0.356 | 0.344 | 0.109 | 0.11 | 0.109 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0039 | 0.0038 | 0.0028 | 0.297 | 0.3 | 0.322 | 0.114 | 0.116 | 0.114 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0012 | -0.0019 | -0.0019 | 0.224 | 0.29 | 0.344 | 0.1 | 0.113 | 0.099 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0036 | 0.0039 | 0.0035 | 0.947 | 0.901 | 0.843 | 0.007 | 0.008 | 0.007 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=0$ | -0.0018 | -0.0019 | -0.0019 | 0.948 | 0.935 | 0.927 | 0.004 | 0.004 | 0.004 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0005 | 0.0006 | 0.0005 | 0.954 | 0.956 | 0.971 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0007 | 0.0006 | 0.0009 | 0.947 | 0.972 | 1 | 0.001 | 0.002 | 0.001 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0031 | 0.0029 | 0.0035 | 0.685 | 0.577 | 0.524 | 0.027 | 0.03 | 0.027 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0036 | 0.0038 | 0.0036 | 0.595 | 0.577 | 0.562 | 0.024 | 0.024 | 0.024 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0033 | 0.0035 | 0.0036 | 0.503 | 0.521 | 0.549 | 0.024 | 0.025 | 0.024 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0036 | 0.0058 | 0.0039 | 0.394 | 0.431 | 0.573 | 0.021 | 0.025 | 0.021 |
| $\mathrm{Tx}=0 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0032 | 0.0003 | 0.0031 | 0.375 | 0.316 | 0.269 | 0.103 | 0.111 | 0.102 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | -0.0007 | -0.0007 | -0.0013 | 0.321 | 0.298 | 0.292 | 0.106 | 0.109 | 0.107 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.5$ | 0.0081 | 0.0091 | 0.0082 | 0.252 | 0.263 | 0.278 | 0.103 | 0.104 | 0.103 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0035 | 0.0022 | 0.0027 | 0.181 | 0.208 | 0.288 | 0.101 | 0.115 | 0.101 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0046 | 0.0076 | 0.0035 | 0.931 | 0.867 | 0.821 | 0.054 | 0.057 | 0.053 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0028 | -0.003 | -0.0036 | 0.941 | 0.939 | 0.938 | 0.031 | 0.031 | 0.031 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{t} 2=0$ | -0.0014 | $-0.0004$ | -0.0007 | 0.943 | 0.954 | 0.963 | 0.022 | 0.022 | 0.022 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{t} 2=0$ | 0.0054 | 0.0053 | 0.0054 | 0.933 | 0.956 | 0.995 | 0.012 | 0.013 | 0.012 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0099 | -0.011 | -0.011 | 0.888 | 0.824 | 0.775 | 0.069 | 0.073 | 0.069 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.004 | -0.0045 | -0.0035 | 0.849 | 0.836 | 0.819 | 0.052 | 0.051 | 0.051 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0004 | 0.0008 | 0.0024 | 0.809 | 0.831 | 0.864 | 0.046 | 0.046 | 0.044 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0027 | 0.0027 | 0.0019 | 0.734 | 0.808 | 0.92 | 0.033 | 0.037 | 0.032 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0012 | -0.002 | -0.0001 | 0.742 | 0.664 | 0.608 | 0.157 | 0.169 | 0.153 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0113 | -0.0109 | -0.0109 | 0.644 | 0.614 | 0.61 | 0.133 | 0.133 | 0.131 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0162 | -0.0126 | -0.0132 | 0.562 | 0.571 | 0.609 | 0.131 | 0.132 | 0.13 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0058 | 0.0082 | 0.0053 | 0.423 | 0.484 | 0.617 | 0.124 | 0.146 | 0.124 |
| Tx = .1; $\rho=0.00 ;$ SS $=20 ;$ SSR $=2 ; \mathrm{t} 2=0$ | -0.0027 | -0.0037 | -0.0024 | 0.942 | 0.878 | 0.825 | 0.037 | 0.039 | 0.037 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0006 | -0.0003 | 0.0004 | 0.939 | 0.925 | 0.923 | 0.022 | 0.022 | 0.022 |
| Tx = .1; $\rho=0.59 ;$ SS =20; SSR =2; $22=0$ | -0.004 | -0.0032 | -0.003 | 0.945 | 0.951 | 0.966 | 0.015 | 0.015 | 0.015 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0008 | 0 | -0.0017 | 0.948 | 0.978 | 0.999 | 0.007 | 0.009 | 0.007 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0193 | 0.0223 | 0.0215 | 0.845 | 0.766 | 0.714 | 0.06 | 0.065 | 0.059 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0014 | 0.0014 | 0.0028 | 0.823 | 0.805 | 0.784 | 0.046 | 0.046 | 0.046 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0005 | 0.0002 | 0.0001 | 0.776 | 0.792 | 0.819 | 0.036 | 0.036 | 0.035 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0023 | -0.0027 | -0.0014 | 0.668 | 0.758 | 0.875 | 0.028 | 0.032 | 0.027 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0014 | 0.0003 | 0.0004 | 0.688 | 0.591 | 0.536 | 0.13 | 0.141 | 0.128 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0158 | -0.0126 | -0.011 | 0.568 | 0.555 | 0.538 | 0.128 | 0.127 | 0.126 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0013 | -0.0006 | -0.0012 | 0.497 | 0.505 | 0.553 | 0.119 | 0.118 | 0.115 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0022 | 0.0019 | 0.0053 | 0.397 | 0.434 | 0.572 | 0.115 | 0.133 | 0.114 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0044 | -0.004 | -0.0048 | 0.938 | 0.884 | 0.836 | 0.021 | 0.022 | 0.021 |
| Tx = .1; $\rho=0.40 ; S S=50 ; S S R=1 ; ~ t 2=0$ | 0.0056 | 0.0054 | 0.0054 | 0.948 | 0.943 | 0.931 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{t} 2=0$ | 0.0003 | 0.0004 | 0.0007 | 0.939 | 0.947 | 0.968 | 0.009 | 0.009 | 0.009 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0016 | -0.002 | -0.0015 | 0.947 | 0.977 | 0.996 | 0.005 | 0.005 | 0.004 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0007 | 0.0026 | -0.0005 | 0.809 | 0.708 | 0.655 | 0.044 | 0.047 | 0.043 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0055 | 0.0048 | 0.0047 | 0.775 | 0.76 | 0.746 | 0.032 | 0.032 | 0.032 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0054 | 0.0053 | 0.0043 | 0.744 | 0.763 | 0.776 | 0.028 | 0.028 | 0.027 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0057 | 0.0026 | 0.0052 | 0.571 | 0.644 | 0.784 | 0.025 | 0.029 | 0.025 |
| Tx = .1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0057 | -0.0086 | -0.0063 | 0.532 | 0.463 | 0.414 | 0.131 | 0.14 | 0.131 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0022 | -0.0017 | -0.0031 | 0.51 | 0.481 | 0.477 | 0.111 | 0.112 | 0.11 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0057 | -0.0038 | -0.0034 | 0.415 | 0.433 | 0.462 | 0.103 | 0.104 | 0.103 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0085 | 0.0034 | 0.0091 | 0.306 | 0.346 | 0.446 | 0.107 | 0.127 | 0.108 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0019 | -0.0033 | -0.0023 | 0.944 | 0.885 | 0.835 | 0.014 | 0.015 | 0.014 |
| Tx = .1; $\rho=0.40 ;$ SS =50; SSR =2; $22=0$ | 0.0038 | 0.0038 | 0.0041 | 0.937 | 0.927 | 0.92 | 0.009 | 0.009 | 0.009 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0004 | -0.0002 | -0.0001 | 0.945 | 0.952 | 0.965 | 0.006 | 0.006 | 0.006 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0021 | -0.0008 | -0.0021 | 0.936 | 0.968 | 0.997 | 0.003 | 0.004 | 0.003 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0015 | -0.0004 | 0.0019 | 0.782 | 0.697 | 0.619 | 0.036 | 0.037 | 0.035 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0047 | -0.0047 | -0.0052 | 0.694 | 0.678 | 0.656 | 0.031 | 0.031 | 0.031 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0031 | 0.0034 | 0.0028 | 0.663 | 0.684 | 0.711 | 0.026 | 0.026 | 0.026 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0067 | -0.0058 | $-0.0073$ | 0.502 | 0.586 | 0.706 | 0.023 | 0.026 | 0.023 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0099 | 0.0026 | 0.0083 | 0.479 | 0.407 | 0.339 | 0.126 | 0.136 | 0.125 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0191 | 0.0194 | 0.018 | 0.432 | 0.416 | 0.404 | 0.108 | 0.108 | 0.108 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0042 | -0.0042 | -0.0042 | 0.355 | 0.36 | 0.387 | 0.114 | 0.115 | 0.114 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.004 | -0.0031 | -0.0038 | 0.252 | 0.325 | 0.392 | 0.104 | 0.117 | 0.104 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0022 | 0.0011 | 0.0024 | 0.944 | 0.888 | 0.842 | 0.01 | 0.011 | 0.01 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0044 | $-0.0045$ | -0.0044 | 0.942 | 0.932 | 0.919 | 0.006 | 0.006 | 0.006 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0026 | -0.0023 | -0.0026 | 0.943 | 0.951 | 0.965 | 0.005 | 0.005 | 0.005 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0005 | 0.0006 | -0.0004 | 0.933 | 0.959 | 0.996 | 0.002 | 0.003 | 0.002 |
| $T x=.1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0002 | 0.0008 | 0 | 0.718 | 0.649 | 0.581 | 0.032 | 0.034 | 0.032 |
| $T x=.1 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0043 | -0.0045 | -0.0047 | 0.662 | 0.631 | 0.613 | 0.026 | 0.026 | 0.026 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0031 | -0.003 | -0.0033 | 0.578 | 0.596 | 0.608 | 0.025 | 0.026 | 0.025 |
| Tx $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0008 | 0.0006 | 0 | 0.457 | 0.537 | 0.647 | 0.022 | 0.026 | 0.022 |
| $T x=.1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.012 | -0.0191 | -0.0118 | 0.409 | 0.335 | 0.291 | 0.116 | 0.122 | 0.116 |
| $T x=.1 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0047 | 0.0059 | 0.0061 | 0.349 | 0.331 | 0.31 | 0.109 | 0.108 | 0.108 |
| $T x=.1 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.02 | 0.0198 | 0.019 | 0.305 | 0.308 | 0.335 | 0.103 | 0.105 | 0.104 |
| Tx $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0073 | -0.0105 | -0.008 | 0.231 | 0.279 | 0.354 | 0.107 | 0.122 | 0.107 |
| Tx $=.1 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=0$ | -0.0028 | $-0.0036$ | -0.0027 | 0.962 | 0.887 | 0.838 | 0.007 | 0.008 | 0.007 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0013 | 0.0016 | 0.0015 | 0.954 | 0.935 | 0.923 | 0.004 | 0.004 | 0.004 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0 | -0.0001 | 0.0002 | 0.933 | 0.947 | 0.964 | 0.003 | 0.003 | 0.003 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0011 | 0.0007 | 0.0012 | 0.947 | 0.973 | 0.997 | 0.002 | 0.002 | 0.002 |
| Tx $=.1 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ t 2=.1$ | -0.0101 | $-0.0078$ | -0.0106 | 0.719 | 0.614 | 0.569 | 0.025 | 0.027 | 0.025 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0057 | 0.0057 | 0.006 | 0.586 | 0.57 | 0.55 | 0.023 | 0.023 | 0.023 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t2}=.1$ | -0.0001 | -0.0008 | 0.0002 | 0.526 | 0.541 | 0.577 | 0.022 | 0.023 | 0.022 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0035 | -0.0027 | -0.0035 | 0.407 | 0.454 | 0.586 | 0.021 | 0.026 | 0.021 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0077 | -0.0065 | -0.0079 | 0.389 | 0.32 | 0.291 | 0.11 | 0.12 | 0.109 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0084 | -0.0069 | -0.0083 | 0.294 | 0.28 | 0.281 | 0.108 | 0.108 | 0.108 |
| $T x=.1 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | -0.0142 | -0.0154 | -0.012 | 0.282 | 0.279 | 0.311 | 0.102 | 0.102 | 0.1 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% <br> incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0119 | 0.0118 | 0.0125 | 0.208 | 0.229 | 0.306 | 0.098 | 0.11 | 0.096 |
| Tx $=.5 ; \rho=0.00 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | $-0.0075$ | $-0.0076$ | -0.0075 | 0.938 | 0.877 | 0.834 | 0.054 | 0.056 | 0.052 |
| Tx $=.5 ; \rho=0.40 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0023 | -0.0025 | -0.0026 | 0.939 | 0.932 | 0.927 | 0.031 | 0.03 | 0.03 |
| Tx $=.5 ; \rho=0.59 ;$ S $=20 ;$ SSR $=1 ; ~ T 2=0$ | 0.0064 | 0.005 | 0.0046 | 0.932 | 0.946 | 0.965 | 0.024 | 0.024 | 0.023 |
| Tx $=.5 ; \rho=0.81 ; ~ S S=20 ; ~ S S R=1 ; ~ T 2=0$ | 0.0026 | 0.0026 | 0.0028 | 0.929 | 0.962 | 0.996 | 0.012 | 0.013 | 0.012 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0066 | 0.0087 | 0.0085 | 0.893 | 0.825 | 0.779 | 0.071 | 0.076 | 0.069 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.011 | -0.0091 | -0.0084 | 0.869 | 0.845 | 0.844 | 0.051 | 0.051 | 0.05 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0129 | -0.0113 | -0.0126 | 0.816 | 0.838 | 0.872 | 0.044 | 0.043 | 0.042 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0058 | 0.005 | 0.002 | 0.768 | 0.817 | 0.916 | 0.03 | 0.035 | 0.03 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ t 2=.5$ | -0.003 | -0.0027 | -0.003 | 0.685 | 0.614 | 0.533 | 0.169 | 0.181 | 0.166 |
| Tx $=.5 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ t 2=.5$ | -0.0005 | 0.0003 | -0.0006 | 0.635 | 0.617 | 0.604 | 0.139 | 0.14 | 0.139 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0189 | -0.0174 | -0.02 | 0.574 | 0.577 | 0.628 | 0.128 | 0.128 | 0.124 |
| Tx $=.5 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ 72=.5$ | 0.0041 | 0.0051 | 0.0045 | 0.434 | 0.499 | 0.652 | 0.116 | 0.127 | 0.113 |
| Tx $=.5 ; \rho=0.00 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0031 | 0.0034 | 0.0028 | 0.95 | 0.88 | 0.843 | 0.034 | 0.038 | 0.033 |
| Tx $=.5 ; \rho=0.40 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0032 | -0.0042 | -0.0041 | 0.926 | 0.915 | 0.907 | 0.024 | 0.024 | 0.023 |
| Tx $=.5 ; \rho=0.59 ;$ S $=20 ; S S R=2 ; ~ T 2=0$ | -0.0009 | -0.0014 | -0.0009 | 0.946 | 0.949 | 0.965 | 0.015 | 0.015 | 0.015 |
| Tx $=.5 ; \rho=0.81 ; ~ S S=20 ; ~ S S R=2 ; ~ T 2=0$ | 0.0027 | 0.0035 | 0.0032 | 0.951 | 0.975 | 0.996 | 0.007 | 0.009 | 0.007 |
| Tx = . $; ~ \rho=0.00 ; ~ S S=20 ; S S R=2 ; ~ 72=.1$ | 0.0032 | 0.0001 | 0.0022 | 0.869 | 0.793 | 0.726 | 0.058 | 0.063 | 0.057 |
| Tx = $5 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ t 2=.1$ | 0.0027 | 0.0029 | 0.0024 | 0.825 | 0.816 | 0.803 | 0.042 | 0.042 | 0.041 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0075 | 0.0074 | 0.0071 | 0.787 | 0.799 | 0.828 | 0.037 | 0.037 | 0.036 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0001 | -0.0006 | 0.0012 | 0.683 | 0.761 | 0.882 | 0.028 | 0.032 | 0.028 |
| Tx = . $5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0052 | -0.0069 | -0.0039 | 0.637 | 0.549 | 0.486 | 0.142 | 0.151 | 0.14 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0306 | 0.0283 | 0.0266 | 0.553 | 0.545 | 0.54 | 0.128 | 0.127 | 0.125 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0017 | 0.002 | -0.0004 | 0.513 | 0.535 | 0.553 | 0.115 | 0.114 | 0.114 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0159 | -0.0238 | -0.0186 | 0.408 | 0.443 | 0.564 | 0.108 | 0.122 | 0.109 |
| Tx $=.5 ; \rho=0.00 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=0$ | 0.0045 | 0.0044 | 0.0047 | 0.937 | 0.883 | 0.823 | 0.021 | 0.022 | 0.021 |
| Tx $=.5 ; \rho=0.40 ; ~ S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0065 | -0.007 | -0.0073 | 0.937 | 0.921 | 0.914 | 0.013 | 0.013 | 0.013 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% <br> incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=.5 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=0$ | -0.0014 | -0.0017 | -0.0014 | 0.936 | 0.948 | 0.965 | 0.009 | 0.009 | 0.009 |
| Tx $=.5 ; \rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=0$ | -0.001 | $-0.0007$ | -0.0006 | 0.944 | 0.969 | 0.995 | 0.005 | 0.005 | 0.004 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0011 | 0.0014 | -0.0013 | 0.822 | 0.725 | 0.671 | 0.042 | 0.045 | 0.042 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0041 | 0.0038 | 0.0032 | 0.767 | 0.747 | 0.735 | 0.034 | 0.034 | 0.034 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0071 | -0.0073 | -0.0072 | 0.709 | 0.73 | 0.753 | 0.03 | 0.03 | 0.03 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0064 | 0.0058 | 0.0046 | 0.601 | 0.657 | 0.798 | 0.025 | 0.028 | 0.025 |
| Tx = . $; ~ \rho=0.00 ; S S=50 ; S S R=1 ; ~ t 2=.5$ | 0.0031 | 0.0017 | 0.0034 | 0.553 | 0.466 | 0.417 | 0.125 | 0.134 | 0.124 |
| Tx = . $; ~ \rho=0.40 ; S S=50 ; S S R=1 ; ~ t 2=.5$ | 0.0022 | 0.0019 | 0.0016 | 0.444 | 0.42 | 0.421 | 0.123 | 0.124 | 0.122 |
| Tx $=.5 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ 72=.5$ | 0.0165 | 0.015 | 0.0158 | 0.43 | 0.443 | 0.467 | 0.112 | 0.112 | 0.112 |
| Tx $=.5 ; \rho=0.81 ;$ SS =50; SSR $=1 ; ~ \mathrm{t} 2=.5$ | -0.0071 | 0.0011 | -0.0059 | 0.32 | 0.369 | 0.481 | 0.104 | 0.119 | 0.101 |
| Tx $=.5 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0018 | 0.002 | 0.0022 | 0.94 | 0.877 | 0.827 | 0.014 | 0.016 | 0.014 |
| Tx $=.5 ; \rho=0.40 ; ~ S S=50 ; ~ S S R=2 ; ~ T 2=0$ | -0.0002 | -0.0001 | -0.0003 | 0.944 | 0.934 | 0.923 | 0.009 | 0.009 | 0.009 |
| Tx $=.5 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=2 ; ~ \mathrm{~T} 2=0$ | $-0.0016$ | -0.0017 | -0.0016 | 0.945 | 0.949 | 0.969 | 0.006 | 0.006 | 0.006 |
| Tx $=.5 ; \rho=0.81 ; ~ S S=50 ; ~ S S R=2 ; ~ T 2=0$ | 0.0011 | 0.0012 | 0.0012 | 0.934 | 0.973 | 0.998 | 0.003 | 0.003 | 0.003 |
| Tx = . $; ~ \rho=0.00 ; ~ S S=50 ; S S R=2 ; ~ t 2=.1$ | 0.006 | 0.0047 | 0.0058 | 0.793 | 0.693 | 0.634 | 0.034 | 0.036 | 0.034 |
| Tx $=.5 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0067 | -0.0057 | -0.0062 | 0.695 | 0.663 | 0.647 | 0.03 | 0.03 | 0.03 |
| Tx $=.5 ; \rho=0.59 ;$ SS =50; SSR $=2 ; ~ \mathrm{~T} 2=.1$ | -0.0065 | -0.0063 | -0.0069 | 0.661 | 0.684 | 0.701 | 0.025 | 0.025 | 0.025 |
| Tx = . $; ~ \rho=0.81 ; ~ \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t2}=.1$ | -0.0006 | -0.0015 | 0.0006 | 0.529 | 0.583 | 0.718 | 0.023 | 0.027 | 0.023 |
| Tx $=.5 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ t 2=.5$ | 0.0014 | 0.0009 | 0.0038 | 0.503 | 0.423 | 0.382 | 0.113 | 0.122 | 0.113 |
| Tx $=.5 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0185 | 0.0186 | 0.0183 | 0.38 | 0.358 | 0.341 | 0.115 | 0.114 | 0.115 |
| Tx $=.5 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=2 ; ~ \mathrm{t} 2=.5$ | 0.0021 | 0.0022 | 0.0026 | 0.33 | 0.342 | 0.356 | 0.118 | 0.117 | 0.119 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0032 | 0.0027 | -0.0025 | 0.243 | 0.292 | 0.372 | 0.103 | 0.117 | 0.103 |
| Tx = .5; $\rho=0.00 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0014 | -0.0034 | -0.0013 | 0.953 | 0.892 | 0.841 | 0.01 | 0.011 | 0.01 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | -0.0047 | -0.0051 | -0.0049 | 0.949 | 0.939 | 0.935 | 0.006 | 0.006 | 0.006 |
| Tx = .5; $\rho=0.59 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.003 | 0.003 | 0.0029 | 0.951 | 0.956 | 0.966 | 0.004 | 0.004 | 0.004 |
| Tx = .5; $\rho=0.81 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0004 | -0.0001 | 0.0002 | 0.955 | 0.973 | 0.998 | 0.002 | 0.003 | 0.002 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | 0.0064 | 0.0064 | 0.006 | 0.735 | 0.648 | 0.574 | 0.03 | 0.032 | 0.03 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% <br> incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0003 | 0.0008 | 0.0001 | 0.665 | 0.644 | 0.625 | 0.026 | 0.026 | 0.026 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.002 | -0.0026 | -0.0023 | 0.612 | 0.622 | 0.664 | 0.023 | 0.023 | 0.023 |
| Tx = .5; $\rho=0.81 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.004 | -0.0055 | -0.0043 | 0.478 | 0.53 | 0.667 | 0.021 | 0.024 | 0.021 |
| Tx = .5; $\rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0028 | 0.0029 | 0.0026 | 0.475 | 0.414 | 0.358 | 0.095 | 0.103 | 0.094 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | 0.0037 | 0.0028 | 0.0032 | 0.353 | 0.326 | 0.328 | 0.103 | 0.103 | 0.103 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | $-0.0086$ | -0.0098 | -0.0081 | 0.311 | 0.319 | 0.349 | 0.104 | 0.105 | 0.104 |
| Tx = .5; $\rho=0.81 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0109 | -0.0125 | -0.0098 | 0.209 | 0.235 | 0.317 | 0.103 | 0.118 | 0.102 |
| Tx = .5; $\rho=0.00 ;$ SS =100; SSR $=2 ; ~ \mathrm{~T} 2=0$ | -0.0049 | -0.004 | -0.0049 | 0.946 | 0.878 | 0.825 | 0.008 | 0.008 | 0.008 |
| Tx = .5; $\rho=0.40 ;$ SS =100; SSR $=2 ; ~ \mathrm{~T} 2=0$ | -0.0025 | -0.0025 | -0.0026 | 0.953 | 0.938 | 0.928 | 0.004 | 0.004 | 0.004 |
| Tx = .5; $\rho=0.59 ;$ SS =100; SSR $=2 ; ~ \mathrm{~T} 2=0$ | 0.0006 | 0.0007 | 0.0005 | 0.959 | 0.964 | 0.972 | 0.003 | 0.003 | 0.003 |
| Tx = .5; $\rho=0.81 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=0$ | 0.0009 | 0.0004 | 0.0008 | 0.937 | 0.973 | 0.995 | 0.002 | 0.002 | 0.002 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | -0.0039 | -0.006 | -0.0041 | 0.673 | 0.579 | 0.498 | 0.028 | 0.03 | 0.028 |
| Tx = .5; $\rho=0.40 ;$ SS = 100; SSR $=2 ; ~ \mathrm{~T} 2=.1$ | -0.0074 | -0.008 | -0.0074 | 0.567 | 0.547 | 0.53 | 0.025 | 0.025 | 0.025 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0054 | 0.006 | 0.0058 | 0.501 | 0.517 | 0.54 | 0.024 | 0.024 | 0.024 |
| Tx = .5; $\rho=0.81 ;$ SS =100; SSR $=2 ; \mathrm{T} 2=.1$ | 0.0042 | 0.0042 | 0.0043 | 0.403 | 0.444 | 0.574 | 0.021 | 0.024 | 0.021 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.5$ | -0.0099 | -0.0102 | -0.01 | 0.378 | 0.298 | 0.277 | 0.113 | 0.125 | 0.113 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.5$ | -0.0062 | -0.0054 | -0.0062 | 0.308 | 0.291 | 0.281 | 0.1 | 0.1 | 0.1 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.5$ | 0.0205 | 0.0216 | 0.0213 | 0.271 | 0.27 | 0.289 | 0.098 | 0.1 | 0.098 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0045 | -0.001 | 0.005 | 0.179 | 0.215 | 0.291 | 0.101 | 0.12 | 0.101 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0077 | -0.0071 | -0.0079 | 0.919 | 0.868 | 0.82 | 0.055 | 0.057 | 0.055 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ 72=0$ | -0.0089 | -0.0101 | -0.0097 | 0.945 | 0.939 | 0.935 | 0.03 | 0.03 | 0.03 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0037 | -0.0045 | -0.0047 | 0.934 | 0.944 | 0.955 | 0.024 | 0.024 | 0.024 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0063 | 0.0068 | 0.0053 | 0.937 | 0.97 | 0.996 | 0.011 | 0.013 | 0.011 |
| Tx = 1; $\rho=0.00 ;$ SS =20; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0005 | -0.0046 | -0.0001 | 0.892 | 0.819 | 0.765 | 0.069 | 0.075 | 0.067 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0012 | -0.0027 | -0.0038 | 0.861 | 0.837 | 0.832 | 0.051 | 0.05 | 0.051 |
| Tx = 1; $\rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0002 | 0.001 | -0.0012 | 0.792 | 0.826 | 0.846 | 0.049 | 0.049 | 0.049 |
| Tx $=1 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0054 | 0.0051 | 0.0078 | 0.745 | 0.808 | 0.919 | 0.031 | 0.037 | 0.031 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0085$ | $-0.0114$ | -0.006 | 0.719 | 0.647 | 0.565 | 0.157 | 0.163 | 0.155 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0077 | 0.0084 | 0.0074 | 0.647 | 0.626 | 0.623 | 0.133 | 0.132 | 0.131 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0024 | 0.0005 | 0.0018 | 0.551 | 0.567 | 0.607 | 0.131 | 0.13 | 0.129 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0097 | -0.0155 | -0.0079 | 0.427 | 0.493 | 0.629 | 0.12 | 0.135 | 0.119 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0041 | 0.0017 | 0.0033 | 0.929 | 0.874 | 0.826 | 0.038 | 0.041 | 0.037 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0098 | -0.0099 | -0.0101 | 0.936 | 0.928 | 0.921 | 0.022 | 0.022 | 0.022 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0029 | -0.0037 | -0.0038 | 0.941 | 0.951 | 0.964 | 0.016 | 0.016 | 0.016 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0014 | -0.002 | 0 | 0.94 | 0.964 | 0.997 | 0.008 | 0.009 | 0.008 |
|  | -0.0105 | -0.0134 | -0.0107 | 0.864 | 0.776 | 0.731 | 0.057 | 0.061 | 0.056 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0053 | 0.0048 | 0.0051 | 0.84 | 0.82 | 0.802 | 0.042 | 0.042 | 0.042 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0088 | -0.0081 | -0.0076 | 0.778 | 0.8 | 0.82 | 0.039 | 0.038 | 0.038 |
| Tx = 1; $\rho=0.81 ;$ SS $=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0011 | -0.0021 | -0.0002 | 0.66 | 0.739 | 0.869 | 0.028 | 0.032 | 0.028 |
| Tx $=1 ; \rho=0.00 ; ~ S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0075 | 0.0093 | 0.0076 | 0.662 | 0.575 | 0.532 | 0.148 | 0.158 | 0.147 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0133 | 0.0139 | 0.0151 | 0.586 | 0.561 | 0.555 | 0.12 | 0.119 | 0.118 |
| Tx $=1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0065 | -0.0068 | -0.0059 | 0.51 | 0.527 | 0.553 | 0.118 | 0.12 | 0.118 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0046 | 0.0043 | 0.0038 | 0.389 | 0.425 | 0.578 | 0.106 | 0.124 | 0.104 |
| Tx = 1; $\rho=0.00 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0015 | 0.0023 | 0.0012 | 0.943 | 0.888 | 0.805 | 0.022 | 0.023 | 0.022 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0019 | -0.001 | -0.0009 | 0.954 | 0.939 | 0.932 | 0.012 | 0.012 | 0.012 |
| Tx $=1 ; \rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0003 | 0.0009 | 0.0005 | 0.95 | 0.961 | 0.973 | 0.009 | 0.009 | 0.008 |
| Tx $=1 ; \rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=0$ | -0.0018 | 0.0004 | -0.0016 | 0.946 | 0.973 | 0.999 | 0.005 | 0.005 | 0.005 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0026 | -0.0042 | -0.0025 | 0.832 | 0.737 | 0.687 | 0.039 | 0.042 | 0.039 |
| $\mathrm{Tx}=1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0102 | -0.0093 | -0.0095 | 0.768 | 0.744 | 0.732 | 0.032 | 0.033 | 0.032 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0098 | -0.0091 | -0.0087 | 0.738 | 0.749 | 0.779 | 0.026 | 0.026 | 0.026 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0039 | -0.004 | -0.0046 | 0.588 | 0.651 | 0.804 | 0.024 | 0.028 | 0.024 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0023 | 0.0018 | 0.0025 | 0.573 | 0.51 | 0.444 | 0.119 | 0.13 | 0.119 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0133 | -0.0133 | -0.0137 | 0.476 | 0.457 | 0.447 | 0.121 | 0.12 | 0.12 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.001 | 0.002 | 0.0002 | 0.399 | 0.408 | 0.43 | 0.116 | 0.116 | 0.115 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.81 ;$ SS = 50; SSR $=1 ; ~ T 2=.5$ | -0.0054 | -0.008 | -0.0036 | 0.333 | 0.349 | 0.466 | 0.099 | 0.115 | 0.099 |
| Tx = 1; $\rho=0.00 ; S S=50 ;$ SSR $=2 ; \mathrm{T} 2=0$ | $-0.0016$ | -0.0015 | -0.0017 | 0.943 | 0.9 | 0.854 | 0.014 | 0.015 | 0.014 |
| Tx $=1 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=0$ | 0.002 | 0.0016 | 0.0013 | 0.952 | 0.937 | 0.933 | 0.009 | 0.009 | 0.009 |
| Tx = 1; $\rho=0.59 ; S S=50 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.0011 | -0.0015 | -0.0014 | 0.939 | 0.945 | 0.957 | 0.007 | 0.007 | 0.007 |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=0$ | 0.0013 | 0.0017 | 0.0013 | 0.951 | 0.976 | 0.999 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=50 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0014 | 0.0034 | 0.0025 | 0.779 | 0.674 | 0.603 | 0.036 | 0.04 | 0.036 |
| Tx = 1; $\rho=0.40 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=.1$ | 0.0044 | 0.0037 | 0.0036 | 0.718 | 0.703 | 0.688 | 0.029 | 0.029 | 0.028 |
| Tx = 1; $\rho=0.59 ;$ SS =50; SSR =2; T2 = . 1 | -0.0029 | -0.0022 | -0.0033 | 0.633 | 0.647 | 0.664 | 0.029 | 0.029 | 0.029 |
| Tx = 1; $\rho=0.81 ;$ SS = 50; SSR =2; $\mathrm{T} 2=.1$ | 0.0032 | 0.0029 | 0.0029 | 0.506 | 0.587 | 0.71 | 0.023 | 0.027 | 0.023 |
| Tx = 1; $\rho=0.00 ;$ SS =50; SSR $=2 ; ~ T 2=.5$ | 0.0051 | 0.0063 | 0.0054 | 0.491 | 0.416 | 0.368 | 0.112 | 0.124 | 0.111 |
| Tx = 1; $\rho=0.40 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=.5$ | 0.0027 | 0.0025 | 0.004 | 0.417 | 0.407 | 0.407 | 0.11 | 0.109 | 0.108 |
| Tx = 1; $\rho=0.59 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=.5$ | 0.0084 | 0.0088 | 0.0078 | 0.325 | 0.344 | 0.372 | 0.11 | 0.11 | 0.109 |
| Tx = 1; $\rho=0.81 ;$ SS =50; SSR =2; $\mathrm{T} 2=.5$ | -0.0039 | -0.0054 | -0.0023 | 0.288 | 0.338 | 0.433 | 0.092 | 0.108 | 0.091 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0016 | 0.0012 | 0.0016 | 0.951 | 0.901 | 0.853 | 0.01 | 0.01 | 0.01 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0004 | 0.0006 | 0.0003 | 0.949 | 0.942 | 0.933 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ;$ SS = 100; SSR = $1 ; ~ \mathrm{~T} 2=0$ | 0.0017 | 0.0014 | 0.0014 | 0.957 | 0.961 | 0.971 | 0.004 | 0.004 | 0.004 |
| Tx = 1; $\rho=0.81 ;$ SS = 100; SSR = 1; $72=0$ | -0.0027 | -0.0029 | -0.0027 | 0.947 | 0.977 | 0.998 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0074 | 0.0054 | 0.0076 | 0.738 | 0.653 | 0.59 | 0.031 | 0.033 | 0.031 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0068 | 0.0069 | 0.0059 | 0.644 | 0.616 | 0.605 | 0.026 | 0.026 | 0.026 |
| Tx = 1; $\rho=0.59 ;$ SS = 100; SSR =1; $22=.1$ | 0.0009 | 0.0004 | 0.0009 | 0.606 | 0.626 | 0.66 | 0.022 | 0.023 | 0.022 |
| Tx = 1; $\rho=0.81 ;$ SS = 100; SSR =1; $22=.1$ | -0.0034 | -0.0051 | -0.0032 | 0.443 | 0.534 | 0.655 | 0.024 | 0.027 | 0.024 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0071 | -0.0074 | -0.0066 | 0.444 | 0.386 | 0.339 | 0.108 | 0.118 | 0.107 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0046 | 0.0054 | 0.0049 | 0.384 | 0.365 | 0.363 | 0.107 | 0.107 | 0.107 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0011 | $-0.0016$ | -0.0021 | 0.355 | 0.362 | 0.373 | 0.102 | 0.103 | 0.102 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.016 | 0.0071 | 0.0146 | 0.223 | 0.253 | 0.335 | 0.109 | 0.127 | 0.107 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0019 | 0.0024 | 0.002 | 0.95 | 0.877 | 0.813 | 0.007 | 0.008 | 0.007 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0008 | 0.0007 | 0.0008 | 0.962 | 0.953 | 0.948 | 0.004 | 0.004 | 0.004 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=0$ | 0.0018 | 0.0016 | 0.0018 | 0.952 | 0.96 | 0.977 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0007 | -0.0005 | -0.0006 | 0.947 | 0.978 | 0.999 | 0.001 | 0.002 | 0.001 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | 0.001 | 0.0008 | 0.0012 | 0.681 | 0.58 | 0.516 | 0.026 | 0.029 | 0.026 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.1$ | 0.0027 | 0.0021 | 0.0024 | 0.582 | 0.57 | 0.547 | 0.024 | 0.024 | 0.024 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0066 | 0.0066 | 0.0069 | 0.533 | 0.547 | 0.569 | 0.025 | 0.025 | 0.025 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.1$ | -0.0007 | -0.0035 | -0.0004 | 0.377 | 0.443 | 0.552 | 0.022 | 0.025 | 0.022 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0016 | -0.0002 | 0.0014 | 0.402 | 0.33 | 0.286 | 0.101 | 0.108 | 0.101 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0149 | -0.0134 | -0.0144 | 0.323 | 0.281 | 0.289 | 0.103 | 0.104 | 0.103 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t2}=.5$ | 0.0101 | 0.0096 | 0.0099 | 0.263 | 0.267 | 0.283 | 0.105 | 0.104 | 0.105 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.5$ | 0.0107 | 0.0163 | 0.0119 | 0.182 | 0.205 | 0.273 | 0.102 | 0.126 | 0.104 |

Simulation results: 5 studies per meta-analysis, random effects

| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete |  | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0076 | 0.009 | 0.0074 | 0.955 | 0.934 | 0.93 | 0.041 | 0.043 | 0.04 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=0$ | -0.0027 | -0.0027 | -0.0015 | 0.951 | 0.943 | 0.939 | 0.026 | 0.025 | 0.025 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=0$ | 0.002 | 0.0015 | 0.002 | 0.964 | 0.967 | 0.974 | 0.016 | 0.016 | 0.016 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0013 | 0.0038 | 0.0019 | 0.961 | 0.974 | 0.998 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0008 | -0.0004 | -0.0004 | 0.921 | 0.9 | 0.891 | 0.061 | 0.061 | 0.06 |
| TX $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0077 | 0.0077 | 0.008 | 0.907 | 0.902 | 0.899 | 0.046 | 0.046 | 0.046 |
| TX $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; T 2=.1$ | 0.0019 | 0.0018 | 0.0006 | 0.901 | 0.908 | 0.913 | 0.037 | 0.037 | 0.037 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0026 | 0.0024 | 0.0039 | 0.895 | 0.906 | 0.945 | 0.027 | 0.028 | 0.027 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; T 2=.5$ | -0.0063 | -0.0077 | -0.0076 | 0.89 | 0.881 | 0.885 | 0.143 | 0.144 | 0.143 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; T 2=.5$ | 0.0142 | 0.0139 | 0.0138 | 0.891 | 0.891 | 0.891 | 0.123 | 0.123 | 0.122 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; T 2=.5$ | 0.0136 | 0.013 | 0.0133 | 0.889 | 0.893 | 0.893 | 0.111 | 0.111 | 0.111 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0041 | -0.0036 | -0.004 | 0.892 | 0.9 | 0.9 | 0.102 | 0.103 | 0.102 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0088 | -0.0102 | -0.0087 | 0.961 | 0.931 | 0.912 | 0.029 | 0.03 | 0.029 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | -0.0038 | -0.0044 | -0.0044 | 0.951 | 0.944 | 0.942 | 0.02 | 0.02 | 0.02 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0004 | -0.0006 | -0.0002 | 0.961 | 0.964 | 0.974 | 0.012 | 0.012 | 0.012 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0011 | 0.0013 | 0.0017 | 0.955 | 0.974 | 0.997 | 0.006 | 0.007 | 0.006 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.007 | 0.0068 | 0.0063 | 0.919 | 0.898 | 0.882 | 0.05 | 0.05 | 0.05 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0025 | -0.0032 | -0.0033 | 0.9 | 0.899 | 0.893 | 0.039 | 0.039 | 0.039 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0056 | -0.0054 | -0.0059 | 0.901 | 0.904 | 0.904 | 0.034 | 0.034 | 0.034 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0014 | -0.0023 | -0.0008 | 0.865 | 0.873 | 0.912 | 0.025 | 0.026 | 0.025 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0136 | 0.0136 | 0.013 | 0.875 | 0.873 | 0.869 | 0.137 | 0.138 | 0.136 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0025 | 0.0025 | 0.0028 | 0.878 | 0.879 | 0.882 | 0.113 | 0.112 | 0.113 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0121 | 0.0119 | 0.0118 | 0.874 | 0.879 | 0.875 | 0.113 | 0.113 | 0.113 |
| TX $=0 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=.5$ | -0.0037 | -0.0047 | -0.0041 | 0.862 | 0.862 | 0.866 | 0.109 | 0.109 | 0.109 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0019 | 0.0013 | 0.0017 | 0.952 | 0.927 | 0.907 | 0.017 | 0.018 | 0.017 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0021 | -0.0021 | -0.0015 | 0.96 | 0.954 | 0.954 | 0.009 | 0.009 | 0.009 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \tau 2=0$ | -0.0025 | -0.0025 | -0.0027 | 0.958 | 0.965 | 0.974 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0035 | 0.0042 | 0.0035 | 0.951 | 0.977 | 0.996 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ \tau 2=.1$ | -0.0025 | -0.0032 | -0.0023 | 0.895 | 0.884 | 0.877 | 0.036 | 0.037 | 0.036 |
| TX $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0035 | 0.0035 | 0.0034 | 0.902 | 0.897 | 0.893 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0071 | 0.0075 | 0.0071 | 0.9 | 0.902 | 0.906 | 0.025 | 0.025 | 0.025 |
| TX $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | -0.0045 | -0.0056 | -0.0045 | 0.894 | 0.898 | 0.912 | 0.022 | 0.023 | 0.022 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0094 | -0.01 | -0.0095 | 0.866 | 0.867 | 0.868 | 0.113 | 0.114 | 0.113 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ \tau 2=.5$ | 0.0058 | 0.0058 | 0.0058 | 0.88 | 0.88 | 0.879 | 0.109 | 0.109 | 0.109 |
| TX $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \tau 2=.5$ | 0.0037 | 0.0038 | 0.0039 | 0.891 | 0.893 | 0.891 | 0.097 | 0.097 | 0.097 |
| TX $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0.012 | 0.0115 | 0.012 | 0.881 | 0.879 | 0.878 | 0.1 | 0.1 | 0.1 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | 0.0028 | 0.0037 | 0.0033 | 0.952 | 0.928 | 0.896 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | 0.0038 | 0.0037 | 0.0037 | 0.961 | 0.956 | 0.95 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0 | -0.0002 | -0.0001 | 0.962 | 0.969 | 0.972 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | 0.0018 | 0.0016 | 0.0021 | 0.964 | 0.98 | 0.998 | 0.002 | 0.003 | 0.002 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ ז 2=.1$ | -0.0084 | -0.008 | -0.008 | 0.901 | 0.883 | 0.884 | 0.032 | 0.033 | 0.032 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ \tau 2=.1$ | 0.0012 | 0.0012 | 0.0011 | 0.893 | 0.892 | 0.891 | 0.027 | 0.027 | 0.027 |
| TX $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | -0.0026 | -0.003 | -0.0029 | 0.887 | 0.888 | 0.893 | 0.026 | 0.026 | 0.026 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.1$ | 0.0007 | 0.0002 | 0.0008 | 0.869 | 0.868 | 0.878 | 0.024 | 0.024 | 0.024 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ \tau 2=.5$ | 0.0071 | 0.0065 | 0.0072 | 0.87 | 0.868 | 0.867 | 0.118 | 0.118 | 0.118 |
| TX $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | 0.0157 | 0.0157 | 0.0157 | 0.857 | 0.863 | 0.859 | 0.107 | 0.107 | 0.107 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | 0.0151 | 0.015 | 0.0149 | 0.866 | 0.866 | 0.866 | 0.111 | 0.111 | 0.111 |
| Tx = 0; $\rho=0.81 ;$ SS = 50; SSR =2; ז2 = . 5 | 0.0032 | 0.0036 | 0.0034 | 0.885 | 0.879 | 0.883 | 0.103 | 0.104 | 0.103 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.003 | -0.0035 | -0.0028 | 0.958 | 0.935 | 0.915 | 0.008 | 0.009 | 0.008 |
| Tx = 0; $\rho=0.40 ; S S=100 ; S S R=1 ; ~ \tau 2=0$ | 0.0003 | 0.0002 | 0.0003 | 0.969 | 0.956 | 0.955 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ \tau 2=0$ | -0.0004 | -0.0002 | -0.0005 | 0.962 | 0.966 | 0.974 | 0.003 | 0.003 | 0.003 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0015 | -0.0013 | -0.0016 | 0.958 | 0.979 | 0.998 | 0.002 | 0.002 | 0.002 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | 0.0039 | 0.0034 | 0.0039 | 0.897 | 0.883 | 0.889 | 0.028 | 0.028 | 0.028 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0039 | 0.0041 | 0.0039 | 0.88 | 0.884 | 0.884 | 0.024 | 0.024 | 0.024 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0083 | 0.0082 | 0.0083 | 0.877 | 0.876 | 0.875 | 0.023 | 0.023 | 0.023 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0065 | 0.0063 | 0.0064 | 0.872 | 0.877 | 0.884 | 0.022 | 0.022 | 0.022 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0056 | -0.005 | -0.0054 | 0.889 | 0.882 | 0.888 | 0.105 | 0.105 | 0.105 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0001 | -0.0001 | -0.0001 | 0.875 | 0.875 | 0.875 | 0.103 | 0.103 | 0.103 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ \mathrm{~T} 2=.5$ | -0.0155 | -0.0155 | -0.0155 | 0.862 | 0.855 | 0.856 | 0.11 | 0.11 | 0.11 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0079 | 0.008 | 0.0079 | 0.893 | 0.884 | 0.892 | 0.103 | 0.103 | 0.103 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=0$ | -0.0001 | -0.0004 | -0.0003 | 0.963 | 0.933 | 0.919 | 0.006 | 0.006 | 0.006 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0015 | 0.0015 | 0.0015 | 0.959 | 0.948 | 0.943 | 0.004 | 0.004 | 0.004 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=0$ | -0.0011 | -0.001 | -0.0012 | 0.959 | 0.968 | 0.975 | 0.002 | 0.002 | 0.002 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0008 | 0.0003 | 0.0008 | 0.971 | 0.979 | 0.998 | 0.001 | 0.001 | 0.001 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.004 | 0.004 | 0.0042 | 0.894 | 0.887 | 0.88 | 0.026 | 0.026 | 0.026 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0056 | 0.0055 | 0.0056 | 0.871 | 0.873 | 0.873 | 0.024 | 0.024 | 0.024 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0018 | 0.0017 | 0.0016 | 0.866 | 0.865 | 0.866 | 0.024 | 0.024 | 0.024 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.0015 | -0.0013 | -0.0015 | 0.87 | 0.873 | 0.878 | 0.021 | 0.021 | 0.021 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | -0.0249 | -0.0248 | -0.0249 | 0.869 | 0.871 | 0.872 | 0.11 | 0.109 | 0.11 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | -0.0053 | -0.0053 | -0.0054 | 0.888 | 0.886 | 0.89 | 0.103 | 0.103 | 0.103 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~$ T2 $=.5$ | -0.015 | -0.015 | -0.015 | 0.881 | 0.885 | 0.882 | 0.097 | 0.097 | 0.097 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0127 | 0.0127 | 0.0127 | 0.884 | 0.883 | 0.884 | 0.101 | 0.101 | 0.101 |
| Tx = . $1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0017 | -0.0034 | -0.0019 | 0.953 | 0.93 | 0.926 | 0.042 | 0.042 | 0.041 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0003 | 0.0013 | 0.0013 | 0.964 | 0.957 | 0.95 | 0.023 | 0.023 | 0.023 |
| Tx $=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0018 | 0.0016 | 0.001 | 0.957 | 0.962 | 0.972 | 0.017 | 0.017 | 0.017 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0072 | 0.0063 | 0.0068 | 0.955 | 0.964 | 0.997 | 0.008 | 0.009 | 0.008 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0022 | 0.0015 | 0.003 | 0.936 | 0.913 | 0.9 | 0.058 | 0.059 | 0.058 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0034 | 0.0027 | 0.0029 | 0.904 | 0.904 | 0.903 | 0.042 | 0.042 | 0.042 |
| TX $=.1 ; \rho=0.59 ;$ SS $=20 ; S S R=1 ; ~ T 2=.1$ | -0.0002 | 0.0002 | 0 | 0.911 | 0.913 | 0.919 | 0.036 | 0.036 | 0.036 |
| $\mathrm{TX}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.01 | -0.0091 | -0.0096 | 0.896 | 0.905 | 0.931 | 0.028 | 0.028 | 0.028 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0165 | -0.0171 | -0.0163 | 0.91 | 0.903 | 0.897 | 0.146 | 0.147 | 0.145 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0026 | -0.0032 | -0.0039 | 0.895 | 0.887 | 0.89 | 0.121 | 0.121 | 0.121 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0123 | -0.0125 | -0.0125 | 0.888 | 0.89 | 0.894 | 0.11 | 0.11 | 0.11 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0114 | -0.0107 | -0.0114 | 0.887 | 0.891 | 0.893 | 0.108 | 0.108 | 0.108 |
| Tx = .1; $\rho=0.00 ;$ SS =20; SSR $=2 ; ~ \mathrm{r} 2=0$ | 0.0078 | 0.0082 | 0.007 | 0.954 | 0.927 | 0.907 | 0.031 | 0.032 | 0.03 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.003 | -0.0032 | -0.0032 | 0.963 | 0.952 | 0.951 | 0.018 | 0.018 | 0.018 |
| Tx = .1; $\rho=0.59 ;$ SS =20; SSR $=2 ; \mathrm{T} 2=0$ | 0.004 | 0.0039 | 0.0053 | 0.949 | 0.952 | 0.965 | 0.013 | 0.013 | 0.013 |
| Tx = 1; $\rho=0.81 ;$ SS =20; SSR $=2 ; \mathrm{T} 2=0$ | -0.0011 | -0.0019 | -0.0022 | 0.957 | 0.966 | 0.999 | 0.006 | 0.007 | 0.006 |
| $T x=.1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.004 | 0.0041 | 0.004 | 0.919 | 0.901 | 0.892 | 0.049 | 0.051 | 0.049 |
| $T x=.1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0019 | -0.0025 | -0.0018 | 0.898 | 0.898 | 0.896 | 0.042 | 0.042 | 0.042 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0012 | 0.001 | 0.001 | 0.897 | 0.902 | 0.914 | 0.031 | 0.031 | 0.031 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.002 | 0.0027 | 0.0023 | 0.892 | 0.895 | 0.92 | 0.027 | 0.028 | 0.027 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0126 | -0.0118 | -0.0123 | 0.878 | 0.868 | 0.868 | 0.134 | 0.135 | 0.133 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0113 | 0.0118 | 0.0119 | 0.9 | 0.895 | 0.899 | 0.114 | 0.114 | 0.114 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0212 | 0.0213 | 0.0215 | 0.877 | 0.879 | 0.877 | 0.117 | 0.117 | 0.117 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0099 | 0.0097 | 0.0102 | 0.876 | 0.873 | 0.885 | 0.107 | 0.108 | 0.107 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0012 | -0.0009 | -0.0009 | 0.967 | 0.941 | 0.921 | 0.015 | 0.015 | 0.015 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0003 | 0.0002 | 0.0001 | 0.969 | 0.958 | 0.96 | 0.009 | 0.009 | 0.009 |
| $T x=.1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.006 | 0.0058 | 0.006 | 0.963 | 0.966 | 0.974 | 0.006 | 0.006 | 0.006 |
| Tx = . $1 ; \rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=0$ | -0.0024 | -0.0019 | -0.0022 | 0.964 | 0.979 | 0.997 | 0.003 | 0.004 | 0.003 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0017 | 0.0011 | 0.0017 | 0.916 | 0.904 | 0.891 | 0.036 | 0.036 | 0.035 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0037 | 0.0036 | 0.0038 | 0.89 | 0.886 | 0.888 | 0.029 | 0.029 | 0.029 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0061 | 0.0061 | 0.0061 | 0.893 | 0.896 | 0.903 | 0.025 | 0.025 | 0.025 |
| Tx = .1; $\rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | -0.0003 | -0.0003 | -0.0001 | 0.877 | 0.891 | 0.898 | 0.024 | 0.024 | 0.024 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0025 | -0.0022 | -0.0028 | 0.881 | 0.875 | 0.876 | 0.118 | 0.119 | 0.118 |
| $T x=.1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0056 | -0.0056 | -0.0055 | 0.872 | 0.873 | 0.876 | 0.108 | 0.108 | 0.108 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.001 | -0.001 | -0.0012 | 0.871 | 0.872 | 0.873 | 0.107 | 0.107 | 0.106 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0219 | -0.021 | -0.0217 | 0.869 | 0.872 | 0.872 | 0.106 | 0.106 | 0.106 |
| $\mathrm{TX}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0012 | -0.0013 | -0.0014 | 0.966 | 0.94 | 0.907 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.40 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0026 | -0.0024 | -0.0024 | 0.952 | 0.941 | 0.942 | 0.007 | 0.007 | 0.007 |
| Tx = .1; $\rho=0.59 ;$ SS =50; SSR $=2 ; \tau 2=0$ | -0.0011 | -0.0007 | -0.0008 | 0.956 | 0.961 | 0.98 | 0.005 | 0.005 | 0.005 |
| Tx = .1; $\rho=0.81 ; ~ S S=50 ; ~ S S R=2 ; ~ T 2=0$ | 0.0011 | 0.0013 | 0.0009 | 0.953 | 0.969 | 0.998 | 0.002 | 0.003 | 0.002 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.004 | -0.0038 | -0.0037 | 0.885 | 0.862 | 0.859 | 0.035 | 0.035 | 0.035 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0017 | 0.0016 | 0.0018 | 0.888 | 0.89 | 0.889 | 0.025 | 0.025 | 0.025 |
| Tx = . $1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0026 | 0.0025 | 0.0026 | 0.904 | 0.905 | 0.904 | 0.024 | 0.024 | 0.024 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0081 | -0.0081 | -0.0081 | 0.88 | 0.878 | 0.896 | 0.022 | 0.023 | 0.022 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0037 | -0.004 | -0.0033 | 0.88 | 0.87 | 0.88 | 0.111 | 0.111 | 0.111 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0113 | 0.0113 | 0.0114 | 0.876 | 0.873 | 0.878 | 0.101 | 0.101 | 0.101 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0062 | 0.0062 | 0.0063 | 0.882 | 0.881 | 0.882 | 0.101 | 0.101 | 0.101 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0079 | -0.0078 | -0.0078 | 0.886 | 0.877 | 0.887 | 0.104 | 0.104 | 0.104 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | -0.0002 | 0.0008 | -0.0005 | 0.963 | 0.946 | 0.929 | 0.007 | 0.008 | 0.007 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.001 | 0.0011 | 0.0012 | 0.955 | 0.944 | 0.938 | 0.005 | 0.005 | 0.005 |
| TX = .1; $\rho=0.59 ;$ SS =100; SSR $=1 ; \mathrm{T} 2=0$ | -0.0005 | -0.0007 | -0.0006 | 0.966 | 0.967 | 0.972 | 0.003 | 0.003 | 0.003 |
| TX = . $; \rho=0.81 ;$ SS = 100; SSR $=1 ; \mathrm{T} 2=0$ | -0.0003 | -0.0002 | -0.0002 | 0.95 | 0.979 | 0.997 | 0.002 | 0.002 | 0.002 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0055 | -0.0059 | -0.0058 | 0.885 | 0.879 | 0.877 | 0.028 | 0.028 | 0.028 |
| TX = . $; ~ \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0004 | -0.0002 | -0.0002 | 0.885 | 0.886 | 0.886 | 0.024 | 0.024 | 0.024 |
| TX = . $1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0095 | -0.0095 | -0.0094 | 0.879 | 0.881 | 0.883 | 0.022 | 0.022 | 0.022 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T}=.1$ | -0.0042 | -0.0038 | -0.0042 | 0.859 | 0.861 | 0.863 | 0.024 | 0.024 | 0.024 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | 0.0067 | 0.0069 | 0.0067 | 0.883 | 0.879 | 0.881 | 0.11 | 0.11 | 0.11 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.002 | -0.002 | -0.0021 | 0.889 | 0.891 | 0.888 | 0.1 | 0.1 | 0.1 |
| TX = .1; $\rho=0.59 ;$ SS =100; SSR $=1 ; \mathrm{T} 2=.5$ | 0.0055 | 0.0056 | 0.0056 | 0.877 | 0.878 | 0.875 | 0.106 | 0.106 | 0.106 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0034 | -0.0039 | -0.0034 | 0.863 | 0.859 | 0.864 | 0.107 | 0.107 | 0.107 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.004 | 0.0035 | 0.004 | 0.959 | 0.933 | 0.918 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0018 | -0.0017 | -0.0018 | 0.963 | 0.964 | 0.955 | 0.003 | 0.003 | 0.003 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX = .1; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.001 | -0.001 | -0.001 | 0.959 | 0.966 | 0.974 | 0.002 | 0.002 | 0.002 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0021 | 0.002 | 0.0021 | 0.964 | 0.977 | 1 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0089 | 0.0092 | 0.0089 | 0.878 | 0.873 | 0.866 | 0.026 | 0.026 | 0.026 |
| TX = .1; $\rho=0.40 ;$ SS =100; SSR =2; $\mathrm{T} 2=.1$ | -0.0005 | -0.0005 | -0.0005 | 0.893 | 0.891 | 0.889 | 0.023 | 0.023 | 0.023 |
| $\mathrm{TX}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0012 | 0.0012 | 0.0011 | 0.87 | 0.87 | 0.873 | 0.024 | 0.024 | 0.024 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0011 | 0.0017 | 0.0011 | 0.864 | 0.865 | 0.872 | 0.022 | 0.022 | 0.022 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0074 | 0.0076 | 0.0074 | 0.889 | 0.882 | 0.891 | 0.103 | 0.103 | 0.103 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0027 | -0.0027 | -0.0027 | 0.895 | 0.896 | 0.897 | 0.097 | 0.097 | 0.097 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0009 | 0.0009 | 0.0009 | 0.877 | 0.874 | 0.874 | 0.114 | 0.114 | 0.114 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0045 | -0.0045 | -0.0045 | 0.897 | 0.883 | 0.893 | 0.102 | 0.102 | 0.102 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0005 | -0.004 | -0.0018 | 0.955 | 0.932 | 0.911 | 0.042 | 0.043 | 0.041 |
| Tx = . $; ~ \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0084 | -0.0089 | -0.0089 | 0.956 | 0.948 | 0.946 | 0.025 | 0.025 | 0.025 |
| Tx $=.5 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.003 | 0.003 | 0.0028 | 0.949 | 0.956 | 0.967 | 0.018 | 0.018 | 0.018 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | -0.001 | -0.0015 | -0.0016 | 0.96 | 0.977 | 0.999 | 0.008 | 0.009 | 0.008 |
| Tx $=.5 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0081 | 0.006 | 0.0086 | 0.927 | 0.9 | 0.891 | 0.059 | 0.06 | 0.059 |
| Tx $=.5 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0003 | 0.0005 | 0.0004 | 0.915 | 0.908 | 0.903 | 0.045 | 0.045 | 0.045 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.001 | 0.0005 | 0.0014 | 0.911 | 0.911 | 0.924 | 0.035 | 0.035 | 0.035 |
| Tx = . $; ~ \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0016 | 0.0004 | 0.0017 | 0.887 | 0.905 | 0.932 | 0.028 | 0.029 | 0.028 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; S S=20 ; S S R=1 ; \mathrm{T} 2=.5$ | 0.0065 | 0.0063 | 0.0065 | 0.883 | 0.868 | 0.87 | 0.144 | 0.144 | 0.144 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0081 | -0.0081 | -0.0079 | 0.878 | 0.873 | 0.877 | 0.122 | 0.121 | 0.122 |
| Tx $=.5 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0005 | -0.0004 | -0.0007 | 0.881 | 0.877 | 0.885 | 0.117 | 0.117 | 0.117 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0051 | -0.0053 | -0.0041 | 0.889 | 0.884 | 0.887 | 0.11 | 0.111 | 0.11 |
| TX $=.5 ; \rho=0.00 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0018 | 0.0029 | 0.0017 | 0.955 | 0.934 | 0.915 | 0.032 | 0.032 | 0.031 |
| Tx $=.5 ; \rho=0.40 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | -0.002 | -0.0017 | -0.0019 | 0.954 | 0.956 | 0.949 | 0.019 | 0.019 | 0.019 |
| Tx $=.5 ; \rho=0.59 ;$ SS $=20 ; S S R=2 ; T^{2}=0$ | -0.0013 | -0.0009 | -0.0001 | 0.952 | 0.956 | 0.968 | 0.013 | 0.013 | 0.013 |
| Tx $=.5 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0006 | 0.0018 | 0.0017 | 0.953 | 0.978 | 1 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; S S=20 ; S S R=2 ; \mathrm{T} 2=.1$ | 0.004 | 0.0055 | 0.0038 | 0.925 | 0.899 | 0.897 | 0.053 | 0.053 | 0.052 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0089 | -0.0089 | -0.0098 | 0.904 | 0.902 | 0.896 | 0.039 | 0.039 | 0.04 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0092 | -0.0088 | -0.0084 | 0.9 | 0.906 | 0.91 | 0.032 | 0.032 | 0.032 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0041 | -0.0033 | -0.0043 | 0.888 | 0.896 | 0.923 | 0.026 | 0.027 | 0.027 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0065 | 0.0071 | 0.0069 | 0.886 | 0.882 | 0.876 | 0.132 | 0.133 | 0.132 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.003 | -0.0028 | -0.0023 | 0.893 | 0.897 | 0.9 | 0.119 | 0.119 | 0.119 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0038 | -0.004 | -0.0044 | 0.865 | 0.865 | 0.872 | 0.12 | 0.12 | 0.12 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0003 | 0.0007 | 0.0002 | 0.872 | 0.873 | 0.883 | 0.108 | 0.109 | 0.108 |
| $T x=.5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0033 | 0.0026 | 0.0027 | 0.957 | 0.947 | 0.919 | 0.015 | 0.016 | 0.015 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0019 | 0.0022 | 0.0022 | 0.955 | 0.941 | 0.94 | 0.01 | 0.01 | 0.01 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0009 | 0.0011 | 0.0007 | 0.949 | 0.959 | 0.971 | 0.007 | 0.007 | 0.007 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0018 | -0.0016 | -0.0019 | 0.963 | 0.98 | 0.999 | 0.003 | 0.003 | 0.003 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0092 | -0.008 | -0.0094 | 0.911 | 0.884 | 0.888 | 0.035 | 0.035 | 0.035 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0022 | 0.0018 | 0.0017 | 0.886 | 0.886 | 0.884 | 0.029 | 0.029 | 0.029 |
| $T x=.5 ; \rho=0.59 ; S S=50 ; S S R=1 ; T 2=.1$ | -0.0006 | -0.0008 | -0.0009 | 0.889 | 0.887 | 0.895 | 0.028 | 0.028 | 0.028 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0075 | -0.0074 | -0.0076 | 0.888 | 0.898 | 0.907 | 0.023 | 0.023 | 0.023 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.001 | -0.0003 | -0.001 | 0.882 | 0.882 | 0.885 | 0.11 | 0.111 | 0.11 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0094 | -0.0095 | -0.0094 | 0.873 | 0.874 | 0.873 | 0.108 | 0.108 | 0.108 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0008 | 0.0009 | 0.0007 | 0.889 | 0.889 | 0.889 | 0.102 | 0.102 | 0.102 |
| $T x=.5 ; \rho=0.81 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0173 | -0.0175 | -0.0175 | 0.883 | 0.877 | 0.879 | 0.104 | 0.104 | 0.104 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; S S=50 ; S S R=2 ; \mathrm{T} 2=0$ | 0.0033 | 0.0028 | 0.0028 | 0.96 | 0.934 | 0.91 | 0.013 | 0.013 | 0.012 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0021 | 0.002 | 0.0018 | 0.956 | 0.95 | 0.946 | 0.007 | 0.007 | 0.007 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0016 | 0.0012 | 0.0016 | 0.966 | 0.974 | 0.982 | 0.005 | 0.005 | 0.005 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0027 | 0.0025 | 0.0025 | 0.966 | 0.976 | 0.998 | 0.002 | 0.003 | 0.002 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0004 | 0.0002 | 0.0008 | 0.919 | 0.915 | 0.909 | 0.03 | 0.031 | 0.03 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0081 | -0.0081 | -0.0079 | 0.867 | 0.868 | 0.864 | 0.029 | 0.029 | 0.029 |
| Tx = . $5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0005 | -0.0005 | -0.0004 | 0.895 | 0.903 | 0.902 | 0.023 | 0.023 | 0.023 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0014 | 0.0019 | 0.0015 | 0.881 | 0.881 | 0.885 | 0.023 | 0.023 | 0.023 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0064 | -0.0064 | -0.0064 | 0.871 | 0.869 | 0.872 | 0.119 | 0.119 | 0.119 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0077 | -0.0076 | -0.0076 | 0.862 | 0.864 | 0.861 | 0.106 | 0.106 | 0.106 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0026 | -0.0027 | -0.0026 | 0.886 | 0.884 | 0.885 | 0.1 | 0.1 | 0.1 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0086 | -0.0088 | -0.0087 | 0.879 | 0.872 | 0.876 | 0.105 | 0.105 | 0.105 |
| Tx $=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | -0.0004 | 0 | -0.0003 | 0.963 | 0.931 | 0.914 | 0.008 | 0.009 | 0.008 |
| Tx = . $; ~ \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | 0.0017 | 0.0019 | 0.002 | 0.953 | 0.952 | 0.945 | 0.005 | 0.005 | 0.005 |
| $T \mathrm{X}=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | -0.0027 | -0.0028 | -0.0029 | 0.946 | 0.955 | 0.961 | 0.004 | 0.004 | 0.004 |
| Tx $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | -0.0027 | -0.0027 | -0.0026 | 0.964 | 0.98 | 1 | 0.002 | 0.002 | 0.002 |
| TX $=.5 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0018 | -0.0013 | -0.0019 | 0.894 | 0.885 | 0.883 | 0.028 | 0.028 | 0.028 |
| TX $=.5 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0009 | -0.0009 | -0.0011 | 0.889 | 0.882 | 0.887 | 0.024 | 0.024 | 0.024 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0021 | 0.0021 | 0.0019 | 0.898 | 0.9 | 0.9 | 0.024 | 0.024 | 0.024 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0061 | -0.0061 | -0.0061 | 0.894 | 0.895 | 0.895 | 0.021 | 0.021 | 0.021 |
| $T X=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0085 | 0.0084 | 0.0085 | 0.888 | 0.883 | 0.885 | 0.108 | 0.108 | 0.108 |
| $T \mathrm{X}=.5 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T}^{2}=.5$ | 0.007 | 0.007 | 0.007 | 0.853 | 0.852 | 0.853 | 0.106 | 0.106 | 0.106 |
| $T \mathrm{X}=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | -0.006 | -0.0059 | -0.006 | 0.87 | 0.869 | 0.869 | 0.104 | 0.104 | 0.104 |
| Tx $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0008 | 0.0006 | 0.0008 | 0.871 | 0.866 | 0.872 | 0.103 | 0.103 | 0.103 |
| TX $=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.003 | 0.0034 | 0.0031 | 0.962 | 0.923 | 0.914 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0023 | -0.0024 | -0.0025 | 0.964 | 0.951 | 0.944 | 0.004 | 0.004 | 0.004 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0025 | -0.0027 | -0.0025 | 0.953 | 0.957 | 0.965 | 0.003 | 0.003 | 0.003 |
| Tx $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0023 | 0.0023 | 0.0023 | 0.962 | 0.976 | 0.997 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0003 | 0 | 0.0003 | 0.881 | 0.87 | 0.871 | 0.028 | 0.028 | 0.028 |
| $T \mathrm{X}=.5 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}^{2}=.1$ | -0.0058 | -0.0057 | -0.0059 | 0.881 | 0.879 | 0.879 | 0.022 | 0.022 | 0.022 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.01 | 0.01 | 0.01 | 0.895 | 0.894 | 0.892 | 0.021 | 0.021 | 0.021 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0023 | 0.0021 | 0.0023 | 0.879 | 0.883 | 0.885 | 0.021 | 0.021 | 0.021 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0115 | -0.0113 | -0.0115 | 0.875 | 0.876 | 0.872 | 0.113 | 0.113 | 0.113 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0113 | 0.0113 | 0.0113 | 0.86 | 0.86 | 0.858 | 0.106 | 0.106 | 0.106 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0016 | 0.0017 | 0.0017 | 0.865 | 0.863 | 0.866 | 0.105 | 0.105 | 0.105 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = . 5; $\rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0006 | -0.0005 | -0.0006 | 0.871 | 0.882 | 0.874 | 0.098 | 0.098 | 0.098 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0147 | -0.0143 | -0.0145 | 0.951 | 0.93 | 0.91 | 0.042 | 0.044 | 0.042 |
| TX $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0007 | -0.0001 | -0.0004 | 0.964 | 0.956 | 0.956 | 0.024 | 0.024 | 0.024 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.004 | 0.0053 | 0.0054 | 0.95 | 0.958 | 0.969 | 0.018 | 0.018 | 0.017 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=0$ | 0.0024 | 0.002 | 0.0028 | 0.959 | 0.972 | 0.996 | 0.008 | 0.009 | 0.008 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0069 | -0.0104 | -0.0074 | 0.911 | 0.888 | 0.879 | 0.066 | 0.068 | 0.065 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0096 | -0.0096 | -0.0102 | 0.91 | 0.902 | 0.901 | 0.045 | 0.045 | 0.045 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0003 | 0.0004 | 0.0005 | 0.91 | 0.912 | 0.927 | 0.036 | 0.036 | 0.036 |
| Tx $=1 ; \rho=0.81 ;$ SS = $20 ;$ SSR $=1 ; ~ \mathrm{r} 2=.1$ | -0.0015 | -0.0003 | -0.0012 | 0.881 | 0.875 | 0.93 | 0.028 | 0.03 | 0.028 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0064 | 0.0069 | 0.0063 | 0.888 | 0.886 | 0.875 | 0.145 | 0.146 | 0.145 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0023 | -0.0019 | -0.0013 | 0.881 | 0.881 | 0.881 | 0.125 | 0.125 | 0.125 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0063 | -0.0068 | -0.0059 | 0.905 | 0.908 | 0.905 | 0.107 | 0.108 | 0.108 |
| Tx $=1 ; \rho=0.81 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0152 | 0.0155 | 0.015 | 0.873 | 0.866 | 0.884 | 0.112 | 0.113 | 0.112 |
| $T x=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0102 | 0.0094 | 0.0089 | 0.955 | 0.924 | 0.907 | 0.033 | 0.034 | 0.033 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0059 | 0.0055 | 0.0059 | 0.958 | 0.949 | 0.95 | 0.019 | 0.019 | 0.019 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0008 | -0.0011 | -0.0002 | 0.941 | 0.949 | 0.961 | 0.014 | 0.014 | 0.014 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=0$ | -0.0043 | -0.0051 | -0.0041 | 0.956 | 0.973 | 0.996 | 0.006 | 0.007 | 0.006 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0043 | 0.0042 | 0.0039 | 0.926 | 0.914 | 0.91 | 0.051 | 0.052 | 0.051 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0081 | 0.0085 | 0.0091 | 0.912 | 0.911 | 0.91 | 0.038 | 0.038 | 0.038 |
| Tx $=1 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | -0.005 | -0.0048 | -0.0049 | 0.895 | 0.899 | 0.904 | 0.035 | 0.035 | 0.035 |
| Tx $=1 ; \rho=0.81 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0073 | -0.0088 | -0.008 | 0.871 | 0.883 | 0.911 | 0.027 | 0.028 | 0.027 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0163 | 0.0165 | 0.0162 | 0.882 | 0.881 | 0.878 | 0.119 | 0.119 | 0.119 |
| TX $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0068 | -0.0064 | -0.0063 | 0.886 | 0.885 | 0.883 | 0.112 | 0.112 | 0.112 |
| Tx $=1 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0129 | 0.0126 | 0.0134 | 0.882 | 0.884 | 0.879 | 0.116 | 0.116 | 0.116 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=.5$ | -0.0026 | -0.003 | -0.0033 | 0.865 | 0.861 | 0.866 | 0.112 | 0.113 | 0.112 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0028 | -0.004 | -0.0031 | 0.958 | 0.927 | 0.905 | 0.016 | 0.017 | 0.016 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0007 | -0.0005 | -0.0004 | 0.964 | 0.96 | 0.956 | 0.009 | 0.009 | 0.009 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX $=1 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0007 | 0.0009 | 0.0009 | 0.975 | 0.978 | 0.981 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0013 | 0.0012 | 0.0007 | 0.956 | 0.982 | 1 | 0.003 | 0.004 | 0.003 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0058 | -0.0049 | -0.0054 | 0.906 | 0.894 | 0.887 | 0.035 | 0.036 | 0.035 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0004 | -0.0003 | -0.0005 | 0.898 | 0.893 | 0.889 | 0.031 | 0.031 | 0.031 |
| Tx $=1 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{r} 2=.1$ | -0.0011 | -0.0013 | -0.0013 | 0.886 | 0.885 | 0.887 | 0.026 | 0.026 | 0.026 |
| Tx = 1; $\rho=0.81 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T}=.1$ | -0.0096 | -0.0106 | -0.0095 | 0.884 | 0.884 | 0.902 | 0.021 | 0.021 | 0.021 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0143 | 0.0145 | 0.0145 | 0.885 | 0.882 | 0.882 | 0.112 | 0.112 | 0.112 |
| Tx $=1 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0097 | 0.0094 | 0.0095 | 0.887 | 0.884 | 0.883 | 0.11 | 0.11 | 0.11 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0034 | 0.0032 | 0.0033 | 0.864 | 0.867 | 0.867 | 0.115 | 0.115 | 0.115 |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.5$ | -0.0166 | -0.0165 | -0.0164 | 0.882 | 0.871 | 0.885 | 0.099 | 0.099 | 0.1 |
| $T \mathrm{~T}=1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0004 | 0.0001 | -0.0002 | 0.963 | 0.93 | 0.913 | 0.013 | 0.013 | 0.013 |
| TX $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0 | 0 | 0.0001 | 0.961 | 0.96 | 0.955 | 0.007 | 0.007 | 0.007 |
| TX $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0013 | -0.0014 | -0.0015 | 0.954 | 0.958 | 0.97 | 0.005 | 0.005 | 0.005 |
| TX $=1 ; \rho=0.81 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0016 | 0.0025 | 0.0019 | 0.967 | 0.984 | 0.996 | 0.002 | 0.003 | 0.002 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0039 | -0.0048 | -0.0043 | 0.914 | 0.902 | 0.899 | 0.031 | 0.031 | 0.031 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0068 | -0.0069 | -0.0069 | 0.892 | 0.885 | 0.886 | 0.028 | 0.028 | 0.028 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0024 | -0.0022 | -0.0021 | 0.867 | 0.868 | 0.869 | 0.027 | 0.027 | 0.027 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0003 | 0.0004 | 0.0003 | 0.871 | 0.868 | 0.881 | 0.023 | 0.023 | 0.023 |
| Tx $=1 ; \rho=0.00 ; S S=50 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0015 | 0.0018 | 0.0013 | 0.881 | 0.873 | 0.88 | 0.118 | 0.118 | 0.118 |
| Tx $=1 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0013 | -0.0012 | -0.0013 | 0.881 | 0.88 | 0.879 | 0.107 | 0.107 | 0.107 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0017 | 0.0017 | 0.0018 | 0.868 | 0.868 | 0.868 | 0.11 | 0.11 | 0.111 |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0025 | -0.0025 | -0.0026 | 0.863 | 0.861 | 0.864 | 0.111 | 0.111 | 0.111 |
| TX $=1 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0038 | -0.0041 | -0.0039 | 0.961 | 0.937 | 0.922 | 0.008 | 0.008 | 0.008 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0017 | -0.0018 | -0.0018 | 0.962 | 0.955 | 0.948 | 0.005 | 0.005 | 0.005 |
| Tx = 1; $\rho=0.59 ;$ SS = 100; SSR $=1 ; \mathrm{T}_{2}=0$ | 0.0021 | 0.0021 | 0.0023 | 0.962 | 0.965 | 0.975 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0015 | -0.0009 | -0.0016 | 0.963 | 0.977 | 0.997 | 0.001 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.003 | -0.0025 | -0.003 | 0.897 | 0.893 | 0.894 | 0.027 | 0.027 | 0.027 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | 0.0041 | 0.0043 | 0.0042 | 0.887 | 0.887 | 0.888 | 0.023 | 0.023 | 0.023 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | -0.004 | -0.004 | -0.0039 | 0.885 | 0.881 | 0.885 | 0.024 | 0.024 | 0.024 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | -0.0001 | -0.0003 | 0 | 0.868 | 0.87 | 0.871 | 0.023 | 0.023 | 0.023 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | -0.0004 | -0.0002 | -0.0004 | 0.875 | 0.878 | 0.873 | 0.109 | 0.109 | 0.109 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | 0.0267 | 0.0267 | 0.0267 | 0.874 | 0.872 | 0.87 | 0.105 | 0.105 | 0.105 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | -0.0283 | -0.0284 | -0.0283 | 0.866 | 0.866 | 0.869 | 0.103 | 0.103 | 0.103 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | -0.0022 | -0.0022 | -0.0022 | 0.891 | 0.89 | 0.889 | 0.106 | 0.106 | 0.106 |
| TX = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0003 | -0.0003 | -0.0004 | 0.956 | 0.916 | 0.902 | 0.006 | 0.007 | 0.006 |
| Tx = 1; $\rho=0.40 ; S S=100 ; S S R=2 ; ~ \tau 2=0$ | 0.001 | 0.0009 | 0.0009 | 0.967 | 0.96 | 0.952 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.59 ; S S=100 ; S S R=2 ; ~ \tau 2=0$ | -0.0001 | -0.0001 | -0.0001 | 0.969 | 0.972 | 0.977 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0009 | -0.0014 | -0.0009 | 0.954 | 0.97 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.1$ | 0.007 | 0.0067 | 0.0069 | 0.903 | 0.887 | 0.893 | 0.024 | 0.025 | 0.024 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.1$ | 0.0037 | 0.0037 | 0.0037 | 0.885 | 0.885 | 0.885 | 0.023 | 0.023 | 0.023 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.1$ | -0.0046 | -0.0046 | -0.0046 | 0.873 | 0.875 | 0.877 | 0.023 | 0.023 | 0.023 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ t 2=.1$ | 0.0016 | 0.0017 | 0.0016 | 0.876 | 0.88 | 0.878 | 0.021 | 0.021 | 0.021 |
| $T x=1 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ t 2=.5$ | 0.011 | 0.0111 | 0.011 | 0.868 | 0.864 | 0.867 | 0.118 | 0.118 | 0.118 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.5$ | 0.0052 | 0.0052 | 0.0052 | 0.87 | 0.87 | 0.872 | 0.108 | 0.108 | 0.108 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.5$ | -0.0179 | -0.0178 | -0.0179 | 0.877 | 0.88 | 0.88 | 0.108 | 0.108 | 0.108 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ t 2=.5$ | 0.0066 | 0.0067 | 0.0066 | 0.864 | 0.865 | 0.865 | 0.102 | 0.102 | 0.102 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | -0.0034 | -0.0018 | -0.0018 | 0.969 | 0.948 | 0.946 | 0.048 | 0.048 | 0.047 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | 0.0106 | 0.01 | 0.0091 | 0.946 | 0.938 | 0.932 | 0.035 | 0.035 | 0.034 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | 0.0046 | 0.0054 | 0.0059 | 0.961 | 0.97 | 0.98 | 0.023 | 0.022 | 0.022 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | 0.0059 | 0.0063 | 0.0069 | 0.957 | 0.975 | 0.995 | 0.012 | 0.013 | 0.012 |
| TX = 0; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \tau 2=.1$ | 0.007 | 0.009 | 0.0077 | 0.924 | 0.894 | 0.895 | 0.076 | 0.079 | 0.075 |
| TX $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0113 | 0.0115 | 0.0118 | 0.926 | 0.917 | 0.92 | 0.05 | 0.05 | 0.05 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | -0.0095 | -0.0094 | -0.01 | 0.904 | 0.907 | 0.919 | 0.045 | 0.045 | 0.044 |
| TX = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0045 | 0.0058 | 0.0044 | 0.878 | 0.9 | 0.933 | 0.033 | 0.034 | 0.033 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{~T}=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0148 | 0.0149 | 0.0142 | 0.899 | 0.882 | 0.887 | 0.149 | 0.149 | 0.147 |
| $T \mathrm{X}=0 ; \rho=0.40 ; \mathrm{SS}=20 ; S S R=1 ; \mathrm{T} 2=.5$ | 0.0304 | 0.0291 | 0.0291 | 0.875 | 0.871 | 0.872 | 0.141 | 0.14 | 0.14 |
| $T \mathrm{~T}=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0146 | 0.0146 | 0.0149 | 0.882 | 0.878 | 0.886 | 0.12 | 0.12 | 0.12 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=.5$ | 0.0024 | 0.003 | 0.0029 | 0.885 | 0.878 | 0.889 | 0.112 | 0.113 | 0.112 |
| TX $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0071 | 0.0062 | 0.0065 | 0.965 | 0.942 | 0.924 | 0.034 | 0.035 | 0.033 |
| $\mathrm{TX}=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0046 | -0.0054 | -0.0053 | 0.963 | 0.96 | 0.955 | 0.022 | 0.022 | 0.021 |
| TX $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0004 | 0.0007 | -0.0006 | 0.964 | 0.974 | 0.979 | 0.014 | 0.014 | 0.014 |
| TX $=0 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=0$ | 0.0003 | 0.0013 | 0 | 0.955 | 0.983 | 0.998 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.00 ;$ SS $=20 ; S S R=2 ; ~ T 2=.1$ | -0.0123 | -0.0121 | -0.0127 | 0.921 | 0.906 | 0.896 | 0.056 | 0.057 | 0.056 |
| $T \mathrm{~T}=0 ; \rho=0.40 ;$ SS $=20 ; S S R=2 ; ~ T 2=.1$ | -0.0005 | -0.0006 | -0.0005 | 0.913 | 0.912 | 0.908 | 0.039 | 0.039 | 0.039 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ; S S R=2 ; ~ T 2=.1$ | -0.0015 | -0.0021 | -0.0029 | 0.88 | 0.883 | 0.89 | 0.04 | 0.041 | 0.04 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=.1$ | -0.0036 | -0.0038 | -0.0037 | 0.889 | 0.899 | 0.941 | 0.027 | 0.027 | 0.027 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0037 | 0.0039 | 0.0039 | 0.912 | 0.906 | 0.9 | 0.135 | 0.137 | 0.135 |
| $T \mathrm{~T}=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0053 | -0.005 | -0.0047 | 0.869 | 0.871 | 0.866 | 0.12 | 0.12 | 0.12 |
| $T \mathrm{~T}=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0084 | 0.0088 | 0.0084 | 0.911 | 0.911 | 0.909 | 0.113 | 0.113 | 0.113 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=.5$ | 0.0099 | 0.0102 | 0.0098 | 0.872 | 0.874 | 0.877 | 0.112 | 0.112 | 0.112 |
| TX $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0004 | -0.0011 | -0.0002 | 0.97 | 0.942 | 0.918 | 0.019 | 0.02 | 0.019 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0071 | -0.0066 | -0.0065 | 0.956 | 0.953 | 0.95 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0056 | 0.0055 | 0.0052 | 0.961 | 0.964 | 0.972 | 0.009 | 0.009 | 0.009 |
| TX $=0 ; \rho=0.81 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.003 | -0.002 | -0.003 | 0.963 | 0.985 | 0.998 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.00 ;$ SS $=50 ; S S R=1 ; ~ T 2=.1$ | -0.003 | -0.0011 | -0.003 | 0.916 | 0.908 | 0.895 | 0.04 | 0.04 | 0.04 |
| $\mathrm{Tx}=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0088 | -0.0088 | -0.009 | 0.889 | 0.888 | 0.886 | 0.034 | 0.034 | 0.034 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0047 | 0.005 | 0.005 | 0.894 | 0.893 | 0.894 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ; S S R=1 ; ~ T 2=.1$ | 0.0027 | 0.0031 | 0.0026 | 0.87 | 0.871 | 0.892 | 0.026 | 0.026 | 0.026 |
| $T \mathrm{X}=0 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0083 | 0.0079 | 0.0081 | 0.888 | 0.885 | 0.888 | 0.111 | 0.111 | 0.11 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ; S S R=1 ; ~ T 2=.5$ | 0.014 | 0.0138 | 0.0138 | 0.884 | 0.882 | 0.884 | 0.112 | 0.112 | 0.112 |
| $\mathrm{TX}=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0103 | 0.0101 | 0.0101 | 0.886 | 0.89 | 0.887 | 0.098 | 0.098 | 0.098 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX $=0 ; \rho=0.81 ;$ SS $=50 ; S S R=1 ; ~ T 2=.5$ | -0.0064 | -0.0062 | -0.0063 | 0.877 | 0.87 | 0.878 | 0.104 | 0.104 | 0.104 |
| TX $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0048 | 0.0055 | 0.0044 | 0.955 | 0.927 | 0.911 | 0.015 | 0.015 | 0.015 |
| TX $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0 | -0.0001 | -0.0002 | 0.963 | 0.955 | 0.954 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0041 | 0.0042 | 0.0036 | 0.953 | 0.961 | 0.97 | 0.006 | 0.006 | 0.006 |
| TX $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0026 | -0.0032 | -0.0027 | 0.955 | 0.973 | 0.999 | 0.003 | 0.003 | 0.003 |
| TX $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0036 | 0.003 | 0.0035 | 0.909 | 0.894 | 0.892 | 0.034 | 0.034 | 0.034 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0018 | 0.0018 | 0.0019 | 0.9 | 0.901 | 0.898 | 0.029 | 0.029 | 0.029 |
| TX $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0072 | -0.0074 | -0.007 | 0.91 | 0.907 | 0.908 | 0.025 | 0.025 | 0.025 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ; S S R=2 ; ~ T 2=.1$ | -0.0038 | -0.0036 | -0.0039 | 0.881 | 0.871 | 0.888 | 0.024 | 0.024 | 0.024 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0178 | -0.0179 | -0.0179 | 0.885 | 0.89 | 0.885 | 0.11 | 0.11 | 0.11 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0086 | -0.0084 | -0.0084 | 0.883 | 0.878 | 0.884 | 0.105 | 0.105 | 0.105 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0002 | -0.0003 | -0.0001 | 0.871 | 0.869 | 0.871 | 0.108 | 0.108 | 0.108 |
| TX $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0059 | -0.0066 | -0.006 | 0.874 | 0.872 | 0.877 | 0.106 | 0.106 | 0.106 |
| $T X=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0021 | -0.0021 | -0.002 | 0.965 | 0.935 | 0.923 | 0.01 | 0.01 | 0.01 |
| $T x=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.002 | 0.0021 | 0.0018 | 0.969 | 0.966 | 0.965 | 0.006 | 0.006 | 0.006 |
| $T x=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.002 | 0.0021 | 0.0018 | 0.955 | 0.967 | 0.974 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | 0 | 0 | 0 | 0.964 | 0.984 | 0.999 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0028 | 0.0032 | 0.0028 | 0.891 | 0.881 | 0.881 | 0.031 | 0.031 | 0.031 |
| $T x=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0007 | -0.0002 | -0.0004 | 0.891 | 0.888 | 0.89 | 0.025 | 0.025 | 0.025 |
| $T x=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0002 | 0.0001 | 0.0001 | 0.887 | 0.883 | 0.887 | 0.025 | 0.025 | 0.025 |
| $T \mathrm{~T}=0 ; \rho=0.81 ; \mathrm{SS}=100 ; S S R=1 ; \tau 2=.1$ | -0.0043 | -0.0041 | -0.0043 | 0.888 | 0.896 | 0.896 | 0.022 | 0.022 | 0.022 |
| $T x=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0143 | 0.0145 | 0.0143 | 0.881 | 0.872 | 0.878 | 0.115 | 0.115 | 0.115 |
| $T \mathrm{~T}=0 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0107 | -0.0107 | -0.0107 | 0.875 | 0.873 | 0.874 | 0.108 | 0.108 | 0.108 |
| $T \mathrm{~T}=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0037 | 0.0037 | 0.0037 | 0.877 | 0.878 | 0.88 | 0.113 | 0.113 | 0.113 |
| $T x=0 ; \rho=0.81 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0011 | -0.001 | -0.0012 | 0.887 | 0.894 | 0.885 | 0.098 | 0.098 | 0.098 |
| $T \mathrm{~T}=0 ; \rho=0.00 ; \mathrm{SS}=100 ; S S R=2 ; \tau 2=0$ | 0.0036 | 0.0035 | 0.0034 | 0.965 | 0.943 | 0.923 | 0.007 | 0.007 | 0.007 |
| $T x=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; \tau 2=0$ | -0.0018 | -0.0019 | -0.0019 | 0.963 | 0.958 | 0.951 | 0.004 | 0.004 | 0.004 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0005 | 0.0005 | 0.0004 | 0.963 | 0.965 | 0.977 | 0.003 | 0.003 | 0.003 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0008 | 0.0008 | 0.0009 | 0.961 | 0.981 | 1 | 0.001 | 0.002 | 0.001 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0028 | 0.0026 | 0.0029 | 0.894 | 0.886 | 0.886 | 0.027 | 0.027 | 0.027 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0034 | 0.0035 | 0.0034 | 0.893 | 0.891 | 0.887 | 0.024 | 0.023 | 0.023 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0033 | 0.0033 | 0.0034 | 0.877 | 0.879 | 0.879 | 0.024 | 0.024 | 0.024 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; ~ S S R=2 ; ~ T 2=.1$ | 0.0034 | 0.0035 | 0.0035 | 0.888 | 0.887 | 0.885 | 0.021 | 0.021 | 0.021 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0024 | 0.0022 | 0.0024 | 0.898 | 0.894 | 0.893 | 0.102 | 0.102 | 0.102 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | -0.0012 | -0.0012 | -0.0012 | 0.883 | 0.881 | 0.885 | 0.106 | 0.106 | 0.106 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0085 | 0.0085 | 0.0085 | 0.88 | 0.877 | 0.877 | 0.103 | 0.103 | 0.103 |
| TX $=0 ; \rho=0.81 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0038 | 0.0036 | 0.0037 | 0.858 | 0.855 | 0.858 | 0.101 | 0.101 | 0.101 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0038 | 0.0052 | 0.0031 | 0.956 | 0.93 | 0.909 | 0.053 | 0.054 | 0.052 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0034 | -0.0038 | -0.0041 | 0.952 | 0.952 | 0.953 | 0.031 | 0.031 | 0.03 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{t}_{2}=0$ | -0.0014 | -0.0007 | -0.0008 | 0.96 | 0.964 | 0.973 | 0.021 | 0.021 | 0.021 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0056 | 0.0054 | 0.0054 | 0.95 | 0.969 | 0.995 | 0.011 | 0.013 | 0.012 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0115 | -0.0122 | -0.0117 | 0.937 | 0.917 | 0.907 | 0.068 | 0.069 | 0.068 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0046 | -0.0045 | -0.004 | 0.919 | 0.918 | 0.909 | 0.051 | 0.051 | 0.051 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0004 | 0.001 | 0.0015 | 0.91 | 0.913 | 0.925 | 0.044 | 0.044 | 0.043 |
| Tx $=.1 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=.1$ | 0.0032 | 0.0031 | 0.0017 | 0.904 | 0.922 | 0.951 | 0.031 | 0.032 | 0.032 |
| TX $=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0009 | 0.0011 | 0.001 | 0.899 | 0.893 | 0.893 | 0.151 | 0.152 | 0.149 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0108 | -0.0105 | -0.0107 | 0.892 | 0.898 | 0.898 | 0.127 | 0.127 | 0.127 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0145 | -0.0141 | -0.0139 | 0.894 | 0.89 | 0.896 | 0.126 | 0.126 | 0.127 |
| Tx $=.1 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=.5$ | 0.0046 | 0.0048 | 0.0048 | 0.86 | 0.852 | 0.878 | 0.12 | 0.121 | 0.12 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0^{2}$ | -0.0034 | -0.0034 | -0.0034 | 0.959 | 0.932 | 0.918 | 0.036 | 0.037 | 0.036 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{r} 2^{2}=0$ | -0.0008 | -0.0003 | 0.0004 | 0.96 | 0.951 | 0.953 | 0.022 | 0.022 | 0.022 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t}_{2}=0$ | -0.004 | -0.0032 | -0.0031 | 0.959 | 0.961 | 0.972 | 0.015 | 0.015 | 0.015 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0011 | -0.0004 | -0.0017 | 0.963 | 0.984 | 0.999 | 0.007 | 0.008 | 0.007 |
| TX = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0206 | 0.0218 | 0.0214 | 0.921 | 0.902 | 0.893 | 0.059 | 0.06 | 0.058 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0021 | 0.0017 | 0.0026 | 0.91 | 0.905 | 0.898 | 0.045 | 0.045 | 0.045 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0001 | 0.0004 | -0.0001 | 0.907 | 0.911 | 0.914 | 0.035 | 0.035 | 0.034 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0018 | -0.0024 | -0.0016 | 0.899 | 0.913 | 0.94 | 0.026 | 0.027 | 0.027 |
| $\mathrm{T} x=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0003 | 0.0007 | -0.001 | 0.878 | 0.884 | 0.874 | 0.127 | 0.127 | 0.126 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0135 | -0.0128 | -0.0125 | 0.876 | 0.882 | 0.875 | 0.123 | 0.123 | 0.123 |
| $\mathrm{TX}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0003 | -0.0008 | -0.0004 | 0.868 | 0.87 | 0.87 | 0.113 | 0.113 | 0.113 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0051 | 0.0039 | 0.0051 | 0.879 | 0.869 | 0.883 | 0.111 | 0.112 | 0.111 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0048 | -0.005 | -0.0051 | 0.954 | 0.929 | 0.902 | 0.021 | 0.021 | 0.021 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0053 | 0.0052 | 0.0052 | 0.958 | 0.957 | 0.95 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; S S=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0004 | 0.0004 | 0.0007 | 0.955 | 0.959 | 0.974 | 0.009 | 0.009 | 0.009 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0016 | -0.0018 | -0.0015 | 0.961 | 0.983 | 0.997 | 0.004 | 0.005 | 0.004 |
| Tx = .1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0013 | -0.0001 | -0.001 | 0.896 | 0.876 | 0.873 | 0.043 | 0.044 | 0.043 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0051 | 0.0047 | 0.0046 | 0.914 | 0.91 | 0.902 | 0.032 | 0.032 | 0.032 |
| $T x=.1 ; ~ \rho=0.59 ; S S=50 ; S S R=1 ; T 2=.1$ | 0.0058 | 0.0058 | 0.0053 | 0.901 | 0.902 | 0.902 | 0.028 | 0.028 | 0.027 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0053 | 0.0045 | 0.005 | 0.88 | 0.888 | 0.904 | 0.025 | 0.025 | 0.025 |
| Tx = .1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0076 | -0.0082 | -0.008 | 0.857 | 0.857 | 0.858 | 0.13 | 0.129 | 0.13 |
| TX = .1; $\rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0029 | -0.0028 | -0.003 | 0.875 | 0.875 | 0.875 | 0.11 | 0.11 | 0.11 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0046 | -0.0046 | -0.0045 | 0.883 | 0.883 | 0.89 | 0.102 | 0.102 | 0.102 |
| $T x=.1 ; \rho=0.81 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0111 | 0.0104 | 0.011 | 0.878 | 0.88 | 0.874 | 0.107 | 0.107 | 0.107 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.002 | -0.0028 | -0.0025 | 0.958 | 0.935 | 0.92 | 0.014 | 0.014 | 0.014 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0038 | 0.0038 | 0.0041 | 0.957 | 0.948 | 0.944 | 0.009 | 0.009 | 0.009 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0004 | -0.0001 | -0.0001 | 0.959 | 0.962 | 0.97 | 0.006 | 0.006 | 0.006 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0021 | -0.0007 | -0.0021 | 0.949 | 0.974 | 0.997 | 0.003 | 0.004 | 0.003 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0014 | 0.0003 | 0.0014 | 0.901 | 0.883 | 0.882 | 0.035 | 0.035 | 0.035 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0045 | -0.0046 | -0.0047 | 0.886 | 0.88 | 0.876 | 0.031 | 0.031 | 0.031 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0026 | 0.0026 | 0.0025 | 0.881 | 0.881 | 0.89 | 0.026 | 0.026 | 0.026 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0071 | -0.0066 | -0.0073 | 0.89 | 0.895 | 0.901 | 0.023 | 0.023 | 0.023 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0082 | 0.0084 | 0.0082 | 0.861 | 0.858 | 0.86 | 0.124 | 0.124 | 0.123 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0184 | 0.0185 | 0.0183 | 0.872 | 0.873 | 0.873 | 0.107 | 0.107 | 0.107 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0038 | -0.0037 | -0.0037 | 0.867 | 0.871 | 0.87 | 0.112 | 0.112 | 0.112 |
| Tx = $1 ; \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0042 | -0.0039 | -0.0042 | 0.874 | 0.868 | 0.876 | 0.102 | 0.102 | 0.102 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | 0.0021 | 0.0012 | 0.0023 | 0.959 | 0.941 | 0.918 | 0.01 | 0.01 | 0.01 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | -0.0045 | -0.0045 | -0.0044 | 0.961 | 0.952 | 0.95 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0025 | -0.0022 | -0.0025 | 0.956 | 0.964 | 0.971 | 0.005 | 0.005 | 0.005 |
| Tx = . $1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | -0.0005 | 0.0005 | -0.0004 | 0.95 | 0.969 | 0.996 | 0.002 | 0.003 | 0.002 |
| TX = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T}=.1$ | 0.0005 | 0.0004 | 0.0004 | 0.875 | 0.862 | 0.863 | 0.032 | 0.032 | 0.032 |
| $T X=.1 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0047 | -0.0047 | -0.0047 | 0.883 | 0.882 | 0.883 | 0.026 | 0.026 | 0.026 |
| $T X=.1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0026 | -0.0026 | -0.0028 | 0.873 | 0.872 | 0.876 | 0.025 | 0.025 | 0.025 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0004 | -0.0004 | -0.0002 | 0.879 | 0.875 | 0.885 | 0.022 | 0.022 | 0.022 |
| $T X=.1 ; \rho=0.00 ; S S=100 ; S S R=1 ; T 2=.5$ | -0.0125 | -0.0129 | -0.0126 | 0.874 | 0.878 | 0.873 | 0.115 | 0.115 | 0.115 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | 0.0056 | 0.0057 | 0.0056 | 0.877 | 0.872 | 0.873 | 0.108 | 0.108 | 0.108 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | 0.0198 | 0.0197 | 0.0197 | 0.875 | 0.876 | 0.876 | 0.103 | 0.103 | 0.103 |
| TX $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.006 | -0.0062 | -0.0061 | 0.874 | 0.869 | 0.873 | 0.106 | 0.106 | 0.106 |
| TX = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0027 | -0.0029 | -0.0025 | 0.973 | 0.937 | 0.924 | 0.007 | 0.007 | 0.007 |
| TX = . $; ~ \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0013 | 0.0014 | 0.0013 | 0.97 | 0.959 | 0.954 | 0.004 | 0.004 | 0.004 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0002 | 0 | 0.0002 | 0.952 | 0.962 | 0.972 | 0.003 | 0.003 | 0.003 |
| TX $=.1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0012 | 0.0007 | 0.0012 | 0.966 | 0.979 | 0.997 | 0.002 | 0.002 | 0.002 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | -0.0105 | -0.0102 | -0.0106 | 0.904 | 0.904 | 0.9 | 0.025 | 0.025 | 0.025 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}=.1$ | 0.0059 | 0.0059 | 0.006 | 0.893 | 0.891 | 0.89 | 0.023 | 0.023 | 0.023 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0001 | 0 | 0.0002 | 0.893 | 0.895 | 0.894 | 0.022 | 0.022 | 0.022 |
| Tx $=.1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0039 | -0.0039 | -0.0038 | 0.881 | 0.877 | 0.888 | 0.021 | 0.021 | 0.021 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0082 | -0.0083 | -0.0083 | 0.889 | 0.884 | 0.888 | 0.109 | 0.11 | 0.11 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0078 | -0.0078 | -0.0078 | 0.892 | 0.892 | 0.89 | 0.107 | 0.107 | 0.107 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0125 | -0.0125 | -0.0124 | 0.869 | 0.874 | 0.869 | 0.101 | 0.101 | 0.101 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0119 | 0.0119 | 0.0119 | 0.879 | 0.875 | 0.88 | 0.097 | 0.097 | 0.097 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0069 | -0.0075 | -0.0064 | 0.957 | 0.925 | 0.915 | 0.052 | 0.053 | 0.051 |
| Tx $=.5 ; \rho=0.40 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0025 | -0.0027 | -0.0027 | 0.958 | 0.952 | 0.953 | 0.03 | 0.03 | 0.03 |
| Tx $=.5 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=0$ | 0.0058 | 0.0046 | 0.0042 | 0.945 | 0.954 | 0.971 | 0.023 | 0.023 | 0.023 |
| Tx $=.5 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.003 | 0.0028 | 0.003 | 0.957 | 0.975 | 0.996 | 0.011 | 0.013 | 0.012 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0076 | 0.0078 | 0.0083 | 0.942 | 0.921 | 0.911 | 0.068 | 0.07 | 0.068 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0098 | -0.0086 | -0.0082 | 0.919 | 0.921 | 0.917 | 0.049 | 0.049 | 0.049 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0122 | -0.0109 | -0.0119 | 0.908 | 0.92 | 0.927 | 0.042 | 0.042 | 0.041 |
| Tx = . $; ~ \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0038 | 0.0035 | 0.0027 | 0.913 | 0.92 | 0.946 | 0.028 | 0.03 | 0.029 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ t 2=.5$ | -0.004 | -0.0026 | -0.0034 | 0.881 | 0.873 | 0.872 | 0.162 | 0.162 | 0.161 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0012 | -0.0011 | -0.0012 | 0.885 | 0.89 | 0.893 | 0.134 | 0.134 | 0.134 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0188 | -0.0187 | -0.0193 | 0.877 | 0.878 | 0.885 | 0.122 | 0.122 | 0.121 |
| TX $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0032 | 0.0028 | 0.0035 | 0.879 | 0.884 | 0.896 | 0.109 | 0.108 | 0.109 |
| $T x=.5 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0031 | 0.0022 | 0.0028 | 0.963 | 0.933 | 0.919 | 0.034 | 0.036 | 0.033 |
| $T x=.5 ; \rho=0.40 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0036 | -0.0043 | -0.0043 | 0.944 | 0.938 | 0.932 | 0.023 | 0.023 | 0.023 |
| Tx $=.5 ; \rho=0.59 ;$ SS $=20 ; S S R=2 ; ~ T 2=0$ | -0.001 | -0.0014 | -0.0009 | 0.96 | 0.96 | 0.97 | 0.015 | 0.015 | 0.015 |
| TX $=.5 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0025 | 0.0033 | 0.0032 | 0.969 | 0.98 | 0.996 | 0.007 | 0.008 | 0.007 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | 0.0042 | 0.003 | 0.0033 | 0.934 | 0.917 | 0.913 | 0.057 | 0.057 | 0.056 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0033 | 0.0036 | 0.0034 | 0.918 | 0.913 | 0.914 | 0.04 | 0.04 | 0.04 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0067 | 0.0069 | 0.0069 | 0.901 | 0.908 | 0.913 | 0.037 | 0.036 | 0.036 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ t 2=.1$ | -0.0004 | -0.0002 | 0.0008 | 0.888 | 0.899 | 0.931 | 0.027 | 0.028 | 0.027 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0044 | -0.0052 | -0.0042 | 0.877 | 0.868 | 0.873 | 0.137 | 0.138 | 0.138 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0267 | 0.0261 | 0.0258 | 0.876 | 0.873 | 0.872 | 0.122 | 0.122 | 0.122 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.5$ | -0.0001 | 0 | -0.0003 | 0.874 | 0.878 | 0.883 | 0.112 | 0.112 | 0.112 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0147 | -0.0152 | -0.015 | 0.897 | 0.895 | 0.899 | 0.105 | 0.105 | 0.106 |
| TX $=.5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0049 | 0.0048 | 0.0052 | 0.957 | 0.927 | 0.91 | 0.021 | 0.022 | 0.021 |
| Tx $=.5 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0065 | -0.007 | -0.0073 | 0.954 | 0.948 | 0.941 | 0.013 | 0.013 | 0.013 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0013 | -0.0015 | -0.0013 | 0.953 | 0.958 | 0.972 | 0.009 | 0.009 | 0.009 |
| TX = . $; ~ \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ \tau 2=0$ | -0.001 | -0.0007 | -0.0006 | 0.956 | 0.973 | 0.996 | 0.004 | 0.005 | 0.004 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0013 | -0.0007 | -0.0016 | 0.909 | 0.892 | 0.873 | 0.042 | 0.042 | 0.042 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0036 | 0.0037 | 0.0034 | 0.894 | 0.888 | 0.889 | 0.034 | 0.034 | 0.034 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0073 | -0.0073 | -0.0074 | 0.891 | 0.896 | 0.895 | 0.03 | 0.03 | 0.03 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0054 | 0.0047 | 0.0047 | 0.884 | 0.888 | 0.902 | 0.024 | 0.025 | 0.024 |
| Tx $=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0042 | 0.0046 | 0.0043 | 0.88 | 0.875 | 0.868 | 0.123 | 0.123 | 0.122 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0009 | 0.0008 | 0.0009 | 0.878 | 0.87 | 0.871 | 0.121 | 0.121 | 0.121 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0153 | 0.0151 | 0.0152 | 0.868 | 0.87 | 0.873 | 0.11 | 0.11 | 0.11 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0058 | -0.0053 | -0.0058 | 0.872 | 0.871 | 0.874 | 0.102 | 0.102 | 0.101 |
| TX = .5; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0019 | 0.0021 | 0.002 | 0.959 | 0.932 | 0.914 | 0.014 | 0.015 | 0.014 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0002 | -0.0001 | -0.0002 | 0.959 | 0.956 | 0.95 | 0.009 | 0.009 | 0.009 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0016 | -0.0017 | -0.0016 | 0.964 | 0.962 | 0.977 | 0.006 | 0.006 | 0.006 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0011 | 0.0011 | 0.0012 | 0.953 | 0.978 | 0.998 | 0.003 | 0.003 | 0.003 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.1$ | 0.006 | 0.0056 | 0.0059 | 0.901 | 0.884 | 0.882 | 0.034 | 0.033 | 0.033 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.1$ | -0.0058 | -0.0057 | -0.0057 | 0.897 | 0.891 | 0.892 | 0.029 | 0.029 | 0.029 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0061 | -0.0061 | -0.0064 | 0.896 | 0.898 | 0.9 | 0.025 | 0.025 | 0.025 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.1$ | 0 | -0.0002 | 0.0002 | 0.882 | 0.883 | 0.895 | 0.023 | 0.023 | 0.023 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.5$ | 0.0041 | 0.0041 | 0.0043 | 0.884 | 0.884 | 0.885 | 0.112 | 0.112 | 0.112 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0183 | 0.0182 | 0.0182 | 0.873 | 0.874 | 0.872 | 0.114 | 0.114 | 0.114 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0026 | 0.0026 | 0.0026 | 0.867 | 0.866 | 0.87 | 0.116 | 0.116 | 0.116 |
| Tx = . $; ~ \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | -0.0025 | -0.002 | -0.0025 | 0.879 | 0.882 | 0.881 | 0.102 | 0.102 | 0.102 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; 72=0$ | -0.0013 | -0.0028 | -0.0013 | 0.968 | 0.934 | 0.917 | 0.01 | 0.01 | 0.01 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{r} 2=0$ | -0.0046 | -0.0048 | -0.0047 | 0.96 | 0.955 | 0.956 | 0.006 | 0.006 | 0.006 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.003 | 0.0031 | 0.0029 | 0.963 | 0.967 | 0.972 | 0.004 | 0.004 | 0.004 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0003 | 0 | 0.0003 | 0.971 | 0.978 | 0.998 | 0.002 | 0.003 | 0.002 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.006 | 0.0065 | 0.0061 | 0.893 | 0.892 | 0.881 | 0.03 | 0.03 | 0.03 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | 0.0002 | 0.0003 | 0.0002 | 0.886 | 0.883 | 0.883 | 0.026 | 0.026 | 0.026 |
| Tx = . $; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.1$ | -0.0025 | -0.0025 | -0.0024 | 0.894 | 0.889 | 0.898 | 0.023 | 0.023 | 0.023 |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | -0.0043 | -0.0044 | -0.0044 | 0.898 | 0.897 | 0.904 | 0.021 | 0.021 | 0.021 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.5$ | 0.0013 | 0.0016 | 0.0013 | 0.892 | 0.898 | 0.893 | 0.094 | 0.094 | 0.094 |
| $T x=.5 ; \rho=0.40 ; S S=100 ; S S R=1 ; \tau 2=.5$ | 0.0035 | 0.0034 | 0.0034 | 0.889 | 0.889 | 0.887 | 0.102 | 0.102 | 0.102 |
| Tx = . $; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.5$ | -0.0065 | -0.0066 | -0.0065 | 0.886 | 0.884 | 0.885 | 0.104 | 0.104 | 0.104 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.5$ | -0.0103 | -0.0105 | -0.0103 | 0.888 | 0.879 | 0.887 | 0.101 | 0.101 | 0.101 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0049 | -0.0043 | -0.0049 | 0.957 | 0.935 | 0.915 | 0.008 | 0.008 | 0.007 |
| TX = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0025 | -0.0026 | -0.0026 | 0.967 | 0.96 | 0.952 | 0.004 | 0.004 | 0.004 |
| TX = . $; ~ \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0006 | 0.0006 | 0.0005 | 0.968 | 0.971 | 0.975 | 0.003 | 0.003 | 0.003 |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0008 | 0.0005 | 0.0008 | 0.955 | 0.978 | 0.995 | 0.002 | 0.002 | 0.002 |
| $T x=.5 ; \rho=0.00 ; S S=100 ; S S R=2 ; \tau 2=.1$ | -0.0044 | -0.0049 | -0.0044 | 0.891 | 0.883 | 0.882 | 0.028 | 0.028 | 0.028 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | -0.0077 | -0.0078 | -0.0077 | 0.87 | 0.872 | 0.868 | 0.025 | 0.025 | 0.025 |
| $T x=.5 ; \rho=0.59 ; S S=100 ; S S R=2 ; \tau 2=.1$ | 0.006 | 0.0061 | 0.0061 | 0.866 | 0.869 | 0.871 | 0.024 | 0.024 | 0.024 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ t 2=.1$ | 0.0043 | 0.0043 | 0.0043 | 0.879 | 0.87 | 0.88 | 0.021 | 0.021 | 0.021 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | -0.0091 | -0.0091 | -0.009 | 0.876 | 0.867 | 0.877 | 0.112 | 0.112 | 0.112 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.5$ | -0.0048 | -0.0048 | -0.0048 | 0.88 | 0.879 | 0.877 | 0.099 | 0.099 | 0.099 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0205 | 0.0206 | 0.0206 | 0.88 | 0.88 | 0.88 | 0.098 | 0.098 | 0.098 |
| $T x=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0048 | 0.0048 | 0.0048 | 0.866 | 0.87 | 0.865 | 0.1 | 0.1 | 0.1 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | -0.008 | -0.0084 | -0.0081 | 0.935 | 0.911 | 0.899 | 0.054 | 0.055 | 0.054 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | -0.0098 | -0.0104 | -0.0099 | 0.96 | 0.959 | 0.958 | 0.03 | 0.03 | 0.03 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ 72=0$ | -0.0045 | -0.0047 | -0.0047 | 0.959 | 0.965 | 0.967 | 0.023 | 0.024 | 0.023 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{r} 2=0$ | 0.006 | 0.0067 | 0.0053 | 0.956 | 0.974 | 0.997 | 0.011 | 0.012 | 0.011 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ \tau 2=.1$ | 0.0006 | -0.0014 | 0.0008 | 0.944 | 0.917 | 0.918 | 0.067 | 0.069 | 0.066 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | -0.0017 | -0.0023 | -0.0033 | 0.934 | 0.929 | 0.924 | 0.049 | 0.049 | 0.05 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0 | 0.0006 | -0.0008 | 0.891 | 0.902 | 0.907 | 0.047 | 0.047 | 0.047 |
| Tx = 1; $\rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ \tau 2=.1$ | 0.0072 | 0.0065 | 0.0081 | 0.895 | 0.903 | 0.946 | 0.03 | 0.032 | 0.031 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0085 | -0.0082 | -0.0072 | 0.897 | 0.888 | 0.886 | 0.152 | 0.151 | 0.152 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; T 2=.5$ | 0.009 | 0.0093 | 0.0094 | 0.889 | 0.882 | 0.884 | 0.129 | 0.129 | 0.129 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.005 | 0.0046 | 0.005 | 0.888 | 0.89 | 0.891 | 0.124 | 0.124 | 0.124 |
| Tx $=1 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0078 | -0.0092 | -0.0079 | 0.869 | 0.872 | 0.883 | 0.116 | 0.116 | 0.116 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0041 | 0.0025 | 0.0034 | 0.952 | 0.927 | 0.912 | 0.038 | 0.039 | 0.037 |
| Tx = 1; $\rho=0.40 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | -0.0097 | -0.0096 | -0.0098 | 0.952 | 0.951 | 0.942 | 0.022 | 0.022 | 0.022 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0032 | -0.0037 | -0.0041 | 0.969 | 0.971 | 0.978 | 0.016 | 0.016 | 0.016 |
| Tx $=1 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0012 | -0.0017 | 0 | 0.961 | 0.973 | 0.997 | 0.008 | 0.009 | 0.008 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0106 | -0.0112 | -0.0103 | 0.923 | 0.892 | 0.893 | 0.055 | 0.057 | 0.055 |
| Tx $=1 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | 0.005 | 0.0049 | 0.0049 | 0.926 | 0.922 | 0.922 | 0.041 | 0.041 | 0.041 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0085 | -0.0084 | -0.0083 | 0.885 | 0.888 | 0.896 | 0.038 | 0.038 | 0.038 |
| Tx = 1; $\rho=0.81 ;$ SS =20; SSR $=2 ; ~ T 2=.1$ | 0.0013 | 0.0003 | 0.0001 | 0.891 | 0.894 | 0.927 | 0.027 | 0.028 | 0.027 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0084 | 0.0091 | 0.009 | 0.89 | 0.887 | 0.891 | 0.144 | 0.145 | 0.144 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0146 | 0.0149 | 0.015 | 0.872 | 0.871 | 0.871 | 0.115 | 0.115 | 0.115 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0053 | -0.0055 | -0.0055 | 0.886 | 0.886 | 0.887 | 0.114 | 0.114 | 0.114 |
| Tx $=1 ; \rho=0.81 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0035 | 0.0035 | 0.0033 | 0.889 | 0.881 | 0.889 | 0.1 | 0.1 | 0.1 |
| Tx = 1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0013 | 0.0013 | 0.0013 | 0.959 | 0.935 | 0.904 | 0.022 | 0.022 | 0.021 |
| Tx = 1; $\rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0018 | -0.0012 | -0.0012 | 0.964 | 0.955 | 0.95 | 0.012 | 0.012 | 0.012 |
| Tx = 1; $\rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0004 | 0.0009 | 0.0005 | 0.965 | 0.97 | 0.977 | 0.008 | 0.009 | 0.008 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0017 | 0.0002 | -0.0016 | 0.957 | 0.977 | 0.999 | 0.005 | 0.005 | 0.005 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0026 | -0.0032 | -0.0022 | 0.921 | 0.896 | 0.893 | 0.039 | 0.039 | 0.039 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0098 | -0.0092 | -0.0092 | 0.912 | 0.907 | 0.904 | 0.032 | 0.032 | 0.032 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0097 | -0.0096 | -0.0093 | 0.905 | 0.908 | 0.913 | 0.025 | 0.025 | 0.025 |
| Tx = 1; $\rho=0.81 ;$ SS =50; SSR =1; $72=.1$ | -0.0044 | -0.0036 | -0.0044 | 0.89 | 0.89 | 0.92 | 0.024 | 0.024 | 0.024 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0027 | 0.0026 | 0.0027 | 0.889 | 0.876 | 0.882 | 0.118 | 0.118 | 0.118 |
| Tx = 1; $\rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0136 | -0.0135 | -0.0136 | 0.881 | 0.883 | 0.882 | 0.118 | 0.118 | 0.118 |
| TX $=1 ; \rho=0.59 ; S S=50 ; S S R=1 ; T 2=.5$ | 0.0005 | 0.0007 | 0.0005 | 0.876 | 0.87 | 0.877 | 0.114 | 0.114 | 0.114 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | -0.0063 | -0.0065 | -0.006 | 0.895 | 0.897 | 0.895 | 0.098 | 0.098 | 0.098 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0014 | -0.0014 | -0.0013 | 0.96 | 0.942 | 0.927 | 0.014 | 0.014 | 0.014 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0018 | 0.0016 | 0.0012 | 0.967 | 0.955 | 0.955 | 0.009 | 0.009 | 0.009 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0013 | -0.0016 | -0.0014 | 0.953 | 0.956 | 0.966 | 0.007 | 0.007 | 0.007 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | 0.0013 | 0.0015 | 0.0013 | 0.959 | 0.979 | 0.999 | 0.003 | 0.003 | 0.003 |
| TX = 1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0022 | 0.0027 | 0.0026 | 0.895 | 0.884 | 0.878 | 0.036 | 0.037 | 0.036 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0038 | 0.0038 | 0.0037 | 0.894 | 0.891 | 0.89 | 0.028 | 0.028 | 0.028 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | -0.003 | -0.0028 | -0.0032 | 0.869 | 0.871 | 0.878 | 0.028 | 0.028 | 0.028 |
| TX $=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.1$ | 0.0033 | 0.0034 | 0.0033 | 0.884 | 0.883 | 0.893 | 0.023 | 0.023 | 0.023 |
| Tx = 1; $\rho=0.00 ; S S=50 ; S S R=2 ; ~ ז 2=.5$ | 0.0047 | 0.0046 | 0.0048 | 0.887 | 0.882 | 0.884 | 0.11 | 0.11 | 0.11 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | 0.0046 | 0.0046 | 0.0046 | 0.871 | 0.864 | 0.869 | 0.107 | 0.107 | 0.107 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | 0.0079 | 0.0078 | 0.0078 | 0.878 | 0.878 | 0.878 | 0.108 | 0.108 | 0.108 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | -0.0025 | -0.0025 | -0.0024 | 0.896 | 0.893 | 0.892 | 0.091 | 0.091 | 0.091 |
| Tx = 1; $\rho=0.00 ; S S=100 ; S S R=1 ; ~ \tau 2=0$ | 0.0018 | 0.0015 | 0.0017 | 0.963 | 0.943 | 0.931 | 0.01 | 0.01 | 0.01 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0003 | 0.0004 | 0.0002 | 0.962 | 0.955 | 0.954 | 0.006 | 0.006 | 0.006 |
| TX = 1; $\rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0016 | 0.0014 | 0.0014 | 0.97 | 0.97 | 0.976 | 0.004 | 0.004 | 0.004 |
| Tx = 1; $\rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0026 | -0.0027 | -0.0027 | 0.961 | 0.983 | 0.998 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T}=.1$ | 0.0077 | 0.0069 | 0.0076 | 0.904 | 0.897 | 0.895 | 0.031 | 0.031 | 0.031 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | 0.006 | 0.006 | 0.0058 | 0.899 | 0.893 | 0.892 | 0.026 | 0.026 | 0.026 |
| $T \mathrm{~T}=1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ T 2=.1$ | 0.001 | 0.0008 | 0.0008 | 0.898 | 0.896 | 0.902 | 0.022 | 0.022 | 0.022 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ t 2=.1$ | -0.0033 | -0.0036 | -0.0033 | 0.864 | 0.869 | 0.878 | 0.024 | 0.024 | 0.024 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ T 2=.5$ | -0.0058 | -0.0057 | -0.0056 | 0.884 | 0.882 | 0.883 | 0.107 | 0.107 | 0.107 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ t 2=.5$ | 0.0051 | 0.0051 | 0.0051 | 0.884 | 0.886 | 0.885 | 0.106 | 0.106 | 0.106 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ t 2=.5$ | -0.0018 | -0.0017 | -0.0018 | 0.886 | 0.884 | 0.886 | 0.101 | 0.101 | 0.101 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ t 2=.5$ | 0.0158 | 0.0153 | 0.0157 | 0.877 | 0.879 | 0.881 | 0.107 | 0.107 | 0.107 |
| Tx = 1; $\rho=0.00 ; S S=100 ; S S R=2 ; ~ ז 2=0$ | 0.0019 | 0.0018 | 0.0018 | 0.969 | 0.931 | 0.923 | 0.007 | 0.008 | 0.007 |
| Tx = 1; $\rho=0.40 ; S S=100 ; S S R=2 ; ~ \tau 2=0$ | 0.0007 | 0.0007 | 0.0007 | 0.971 | 0.965 | 0.964 | 0.004 | 0.004 | 0.004 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0018 | 0.0017 | 0.0018 | 0.964 | 0.968 | 0.98 | 0.003 | 0.003 | 0.003 |
| Tx $=1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.0007 | -0.0005 | -0.0006 | 0.963 | 0.983 | 0.999 | 0.001 | 0.002 | 0.001 |
| TX $=1 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0014 | 0.0012 | 0.0015 | 0.888 | 0.877 | 0.874 | 0.026 | 0.026 | 0.026 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0027 | 0.0025 | 0.0027 | 0.884 | 0.888 | 0.884 | 0.024 | 0.024 | 0.024 |
| TX $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0068 | 0.0069 | 0.0068 | 0.862 | 0.863 | 0.862 | 0.024 | 0.024 | 0.024 |
| TX = 1; $\rho=0.81 ;$ SS =100; SSR $=2 ; \mathrm{T} 2=.1$ | -0.0003 | -0.0004 | -0.0003 | 0.887 | 0.887 | 0.894 | 0.021 | 0.021 | 0.021 |
| $T \mathrm{~T}=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0013 | 0.0012 | 0.0013 | 0.889 | 0.886 | 0.885 | 0.1 | 0.1 | 0.1 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0149 | -0.0148 | -0.0149 | 0.874 | 0.873 | 0.875 | 0.102 | 0.102 | 0.102 |
| $T \mathrm{~T}=1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.01 | 0.01 | 0.0099 | 0.888 | 0.889 | 0.892 | 0.104 | 0.104 | 0.104 |
| $T \mathrm{X}=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0106 | 0.0106 | 0.0106 | 0.887 | 0.882 | 0.885 | 0.103 | 0.103 | 0.103 |

Simulation results: 10 studies per meta-analysis, fixed effect

| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0049 | -0.0053 | -0.0047 | 0.944 | 0.855 | 0.834 | 0.021 | 0.023 | 0.02 |
| TX $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0052 | 0.0056 | 0.0063 | 0.929 | 0.917 | 0.906 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | -0.0018 | -0.0018 | -0.0019 | 0.936 | 0.948 | 0.962 | 0.009 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | -0.0016 | -0.0023 | -0.0015 | 0.926 | 0.955 | 0.998 | 0.004 | 0.005 | 0.004 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0043 | -0.0016 | -0.0054 | 0.876 | 0.793 | 0.744 | 0.031 | 0.033 | 0.03 |
| TX $=0 ; \rho=0.40 ; ~ S S=20 ; ~ S S R=1 ; ~ 22=.1$ | 0.0012 | 0.0008 | 0.0001 | 0.838 | 0.815 | 0.806 | 0.022 | 0.022 | 0.022 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0032 | 0.0016 | 0.0016 | 0.768 | 0.801 | 0.837 | 0.02 | 0.02 | 0.02 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0006 | 0.0016 | 0.0007 | 0.693 | 0.739 | 0.909 | 0.013 | 0.016 | 0.013 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0068 | -0.0049 | -0.0071 | 0.697 | 0.602 | 0.55 | 0.072 | 0.076 | 0.07 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0069 | 0.0063 | 0.0075 | 0.585 | 0.577 | 0.57 | 0.062 | 0.061 | 0.061 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.008 | 0.0089 | 0.006 | 0.508 | 0.521 | 0.562 | 0.07 | 0.071 | 0.068 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0059 | 0.0008 | -0.0075 | 0.404 | 0.437 | 0.612 | 0.054 | 0.064 | 0.053 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ ז 2=0$ | -0.0013 | -0.0011 | -0.0007 | 0.942 | 0.873 | 0.835 | 0.015 | 0.016 | 0.015 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ ז 2=0$ | -0.0002 | -0.0002 | -0.0006 | 0.939 | 0.922 | 0.913 | 0.01 | 0.01 | 0.01 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ ז 2=0$ | 0.0002 | -0.0005 | -0.0003 | 0.928 | 0.95 | 0.96 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | -0.0012 | -0.0025 | -0.0016 | 0.927 | 0.949 | 0.997 | 0.003 | 0.004 | 0.003 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0033 | 0.0005 | 0.0027 | 0.862 | 0.775 | 0.731 | 0.026 | 0.027 | 0.025 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; \tau 2=.1$ | -0.004 | -0.0041 | -0.0045 | 0.83 | 0.809 | 0.794 | 0.019 | 0.019 | 0.019 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0 | -0.0003 | -0.0009 | 0.765 | 0.793 | 0.811 | 0.017 | 0.017 | 0.017 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0003 | 0.0002 | -0.0013 | 0.625 | 0.687 | 0.849 | 0.014 | 0.016 | 0.013 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0029 | 0.0045 | 0.0022 | 0.65 | 0.556 | 0.512 | 0.066 | 0.071 | 0.063 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; \tau 2=.5$ | -0.0096 | -0.0095 | -0.0087 | 0.531 | 0.536 | 0.527 | 0.059 | 0.058 | 0.057 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0041 | 0.0047 | 0.0054 | 0.475 | 0.487 | 0.517 | 0.06 | 0.06 | 0.058 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.018 | -0.0154 | -0.0183 | 0.35 | 0.391 | 0.521 | 0.057 | 0.068 | 0.056 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ \tau 2=0$ | 0.0029 | 0.0033 | 0.0026 | 0.938 | 0.856 | 0.825 | 0.008 | 0.009 | 0.008 |
| TX $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.005 | -0.0045 | -0.0046 | 0.93 | 0.921 | 0.91 | 0.005 | 0.005 | 0.005 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0004 | 0.0005 | 0.0002 | 0.947 | 0.956 | 0.967 | 0.003 | 0.003 | 0.003 |
| TX $=0 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0009 | -0.0001 | 0.0011 | 0.941 | 0.97 | 0.997 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0006 | 0.0007 | 0.0001 | 0.795 | 0.687 | 0.635 | 0.019 | 0.02 | 0.018 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0036 | -0.0032 | -0.0042 | 0.734 | 0.719 | 0.702 | 0.015 | 0.015 | 0.014 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{r} 2=.1$ | 0.0046 | 0.0042 | 0.0047 | 0.634 | 0.664 | 0.689 | 0.014 | 0.014 | 0.014 |
|  | -0.0021 | -0.0027 | -0.0019 | 0.536 | 0.597 | 0.755 | 0.011 | 0.013 | 0.011 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0119 | 0.0104 | 0.0113 | 0.504 | 0.426 | 0.364 | 0.061 | 0.066 | 0.061 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0012 | 0.0015 | 0.0004 | 0.454 | 0.45 | 0.434 | 0.057 | 0.056 | 0.056 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0014 | -0.0023 | -0.0018 | 0.366 | 0.378 | 0.392 | 0.054 | 0.055 | 0.054 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0027 | 0.0051 | 0.004 | 0.251 | 0.288 | 0.406 | 0.053 | 0.065 | 0.053 |
| TX $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0033 | 0.0032 | 0.003 | 0.951 | 0.874 | 0.842 | 0.006 | 0.007 | 0.006 |
| TX $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0031 | -0.0034 | -0.0031 | 0.947 | 0.939 | 0.931 | 0.004 | 0.004 | 0.004 |
| $T x=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0017 | 0.0015 | 0.0018 | 0.957 | 0.965 | 0.968 | 0.002 | 0.003 | 0.002 |
| Tx $=0 ; \rho=0.81 ;$ SS = 50; SSR $=2 ;$ T2 $=0$ | -0.0021 | -0.0031 | -0.0019 | 0.945 | 0.974 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0008 | -0.001 | -0.0004 | 0.774 | 0.662 | 0.614 | 0.015 | 0.016 | 0.015 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0007 | 0.0008 | 0.0007 | 0.681 | 0.661 | 0.652 | 0.014 | 0.014 | 0.014 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0018 | 0.0007 | 0.0014 | 0.614 | 0.645 | 0.668 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.81 ;$ SS = 50; SSR $=2 ; ~ \mathrm{r} 2=.1$ | 0.0031 | 0.0047 | 0.0027 | 0.439 | 0.489 | 0.676 | 0.012 | 0.014 | 0.012 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0002 | -0.001 | -0.0005 | 0.478 | 0.387 | 0.37 | 0.057 | 0.063 | 0.056 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=2 ; ~$ 2 $2=.5$ | 0.002 | 0.0018 | 0.0004 | 0.367 | 0.363 | 0.334 | 0.057 | 0.056 | 0.057 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0055 | 0.0063 | 0.0052 | 0.316 | 0.329 | 0.354 | 0.056 | 0.056 | 0.056 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0048 | 0.0035 | 0.007 | 0.234 | 0.259 | 0.354 | 0.049 | 0.056 | 0.048 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0048 | 0.0042 | 0.0048 | 0.943 | 0.863 | 0.828 | 0.004 | 0.005 | 0.004 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0013 | -0.0013 | -0.0013 | 0.947 | 0.939 | 0.922 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0002 | 0.0003 | 0.0002 | 0.945 | 0.956 | 0.97 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0004 | 0.0007 | 0.0003 | 0.949 | 0.963 | 0.997 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0034 | 0.0028 | 0.0028 | 0.696 | 0.577 | 0.52 | 0.014 | 0.015 | 0.014 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0065 | -0.0061 | -0.0061 | 0.583 | 0.563 | 0.546 | 0.013 | 0.013 | 0.013 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0002 | 0.0001 | 0.0004 | 0.524 | 0.531 | 0.556 | 0.012 | 0.013 | 0.012 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0017 | -0.0032 | -0.0016 | 0.389 | 0.454 | 0.608 | 0.011 | 0.013 | 0.011 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0008 | -0.0009 | -0.0012 | 0.403 | 0.32 | 0.299 | 0.057 | 0.062 | 0.057 |
| TX $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | -0.0024 | -0.002 | -0.003 | 0.339 | 0.333 | 0.304 | 0.052 | 0.052 | 0.052 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0098 | 0.0096 | 0.0089 | 0.256 | 0.268 | 0.287 | 0.053 | 0.054 | 0.053 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0056 | 0.0012 | 0.0054 | 0.21 | 0.22 | 0.329 | 0.049 | 0.062 | 0.049 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0013 | 0.0013 | 0.0014 | 0.955 | 0.886 | 0.847 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0001 | -0.0001 | -0.0001 | 0.946 | 0.939 | 0.929 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0006 | 0.0006 | 0.0006 | 0.934 | 0.951 | 0.962 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0021 | 0.0023 | 0.0021 | 0.939 | 0.963 | 0.999 | 0.001 | 0.001 | 0.001 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.0025 | -0.0013 | -0.0023 | 0.669 | 0.566 | 0.54 | 0.012 | 0.014 | 0.012 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.0005 | -0.0007 | -0.0002 | 0.541 | 0.517 | 0.508 | 0.012 | 0.012 | 0.012 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0012 | 0.0007 | 0.001 | 0.471 | 0.499 | 0.527 | 0.011 | 0.011 | 0.011 |
| TX $=0 ; \rho=0.81 ;$ SS $=100 ; S S R=2 ; ~ T 2=.1$ | -0.0012 | -0.0002 | -0.0012 | 0.331 | 0.393 | 0.546 | 0.011 | 0.012 | 0.01 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0074 | 0.0086 | 0.0071 | 0.369 | 0.3 | 0.275 | 0.052 | 0.058 | 0.052 |
| TX $=0 ; \rho=0.40 ;$ SS $=100 ; S S R=2 ; ~ T 2=.5$ | -0.0109 | -0.0116 | -0.0103 | 0.294 | 0.28 | 0.279 | 0.051 | 0.052 | 0.051 |
| TX $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~$ 2 $2=.5$ | 0.0005 | -0.0003 | 0.0004 | 0.236 | 0.239 | 0.273 | 0.052 | 0.052 | 0.052 |
| TX $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0011 | -0.0004 | -0.0018 | 0.171 | 0.199 | 0.265 | 0.056 | 0.064 | 0.056 |
| Tx = .1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0059 | -0.0067 | -0.006 | 0.94 | 0.872 | 0.832 | 0.02 | 0.022 | 0.02 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0053 | -0.0057 | -0.0056 | 0.932 | 0.919 | 0.909 | 0.013 | 0.013 | 0.013 |
| Tx = .1; $\rho=0.59 ;$ SS $=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0006 | -0.0007 | -0.0009 | 0.94 | 0.955 | 0.97 | 0.009 | 0.009 | 0.008 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.002 | -0.0017 | -0.0024 | 0.929 | 0.955 | 0.997 | 0.004 | 0.005 | 0.004 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0093 | 0.008 | 0.0085 | 0.864 | 0.756 | 0.727 | 0.031 | 0.035 | 0.03 |
| $T x=.1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0022 | -0.0018 | -0.0013 | 0.825 | 0.812 | 0.785 | 0.024 | 0.024 | 0.024 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0056 | 0.0053 | 0.0056 | 0.808 | 0.818 | 0.85 | 0.018 | 0.019 | 0.019 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0028 | 0.0051 | 0.0031 | 0.661 | 0.702 | 0.89 | 0.015 | 0.018 | 0.015 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0056 | -0.0052 | -0.0061 | 0.683 | 0.572 | 0.541 | 0.074 | 0.078 | 0.072 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0065 | 0.0067 | 0.006 | 0.596 | 0.566 | 0.548 | 0.063 | 0.063 | 0.061 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.006 | -0.0052 | -0.0038 | 0.527 | 0.554 | 0.588 | 0.06 | 0.062 | 0.06 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0067 | 0.01 | 0.0062 | 0.359 | 0.407 | 0.569 | 0.056 | 0.066 | 0.056 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{r} 2=0$ | -0.0016 | -0.0017 | -0.0013 | 0.931 | 0.869 | 0.823 | 0.016 | 0.017 | 0.016 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{r} 2=0$ | 0.0044 | 0.0036 | 0.0035 | 0.94 | 0.929 | 0.926 | 0.01 | 0.01 | 0.009 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0011 | 0.002 | 0.0023 | 0.94 | 0.952 | 0.964 | 0.006 | 0.006 | 0.006 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t}^{2}=0$ | 0.0001 | 0.0006 | -0.0002 | 0.931 | 0.957 | 1 | 0.003 | 0.004 | 0.003 |
| $T x=.1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0027 | -0.0015 | -0.0032 | 0.83 | 0.757 | 0.706 | 0.028 | 0.029 | 0.027 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.004 | 0.0057 | 0.0058 | 0.787 | 0.778 | 0.772 | 0.02 | 0.02 | 0.02 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.001 | -0.001 | -0.001 | 0.757 | 0.779 | 0.81 | 0.016 | 0.017 | 0.017 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0009 | 0.0029 | 0.0017 | 0.622 | 0.668 | 0.848 | 0.014 | 0.017 | 0.014 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0001 | -0.0039 | -0.0022 | 0.654 | 0.534 | 0.505 | 0.067 | 0.073 | 0.065 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0033 | 0.0067 | 0.0066 | 0.558 | 0.542 | 0.529 | 0.064 | 0.063 | 0.064 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0002 | 0.0006 | -0.0005 | 0.458 | 0.478 | 0.497 | 0.063 | 0.063 | 0.061 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0076 | -0.0084 | -0.0097 | 0.359 | 0.387 | 0.543 | 0.055 | 0.068 | 0.055 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0026 | -0.0027 | -0.0023 | 0.94 | 0.864 | 0.819 | 0.009 | 0.009 | 0.009 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0002 | -0.0001 | 0.0003 | 0.955 | 0.951 | 0.937 | 0.005 | 0.005 | 0.005 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0003 | -0.0002 | 0 | 0.946 | 0.95 | 0.965 | 0.003 | 0.003 | 0.003 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.001 | -0.0008 | -0.0012 | 0.938 | 0.962 | 0.999 | 0.002 | 0.002 | 0.002 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0054 | 0.0057 | 0.0049 | 0.818 | 0.718 | 0.643 | 0.017 | 0.019 | 0.017 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0003 | 0.0004 | 0.0008 | 0.715 | 0.699 | 0.683 | 0.016 | 0.016 | 0.016 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0018 | 0.0008 | 0.0016 | 0.663 | 0.68 | 0.708 | 0.014 | 0.014 | 0.014 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0066 | -0.0048 | -0.0066 | 0.509 | 0.564 | 0.741 | 0.012 | 0.014 | 0.012 |
| $T x=.1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0155 | -0.0222 | -0.0157 | 0.54 | 0.414 | 0.389 | 0.055 | 0.061 | 0.055 |
| $T x=.1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0072 | 0.0068 | 0.007 | 0.428 | 0.425 | 0.409 | 0.053 | 0.053 | 0.053 |
| $T x=.1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0005 | -0.0003 | 0.001 | 0.341 | 0.359 | 0.385 | 0.057 | 0.057 | 0.056 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0009 | -0.0015 | 0.0015 | 0.252 | 0.279 | 0.409 | 0.054 | 0.064 | 0.054 |
| Tx = .1; $\rho=0.00 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0035 | -0.0038 | -0.0029 | 0.952 | 0.88 | 0.848 | 0.006 | 0.006 | 0.006 |
| Tx = .1; $\rho=0.40 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=0$ | -0.0013 | -0.0013 | -0.0016 | 0.95 | 0.94 | 0.921 | 0.003 | 0.003 | 0.003 |
| Tx = . $1 ; \rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | -0.0022 | -0.0022 | -0.0021 | 0.948 | 0.955 | 0.971 | 0.003 | 0.003 | 0.003 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0004 | 0.0001 | -0.0005 | 0.959 | 0.968 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0015 | 0.0033 | 0.0013 | 0.75 | 0.639 | 0.604 | 0.017 | 0.019 | 0.017 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0001 | 0 | -0.0004 | 0.694 | 0.672 | 0.651 | 0.013 | 0.013 | 0.013 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0005 | 0.0018 | 0.0012 | 0.648 | 0.657 | 0.682 | 0.012 | 0.012 | 0.012 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.001 | 0.0015 | 0.0009 | 0.447 | 0.52 | 0.679 | 0.012 | 0.014 | 0.012 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0072 | -0.0064 | -0.0056 | 0.46 | 0.377 | 0.32 | 0.057 | 0.063 | 0.056 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0047 | 0.0037 | 0.0039 | 0.379 | 0.359 | 0.348 | 0.054 | 0.053 | 0.053 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0062 | 0.0039 | 0.0028 | 0.319 | 0.316 | 0.333 | 0.056 | 0.056 | 0.056 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0005 | 0.0007 | -0.0027 | 0.243 | 0.274 | 0.362 | 0.05 | 0.057 | 0.05 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0011 | 0.002 | 0.0014 | 0.943 | 0.858 | 0.839 | 0.004 | 0.005 | 0.004 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0006 | -0.0004 | -0.0007 | 0.945 | 0.931 | 0.923 | 0.002 | 0.002 | 0.002 |
| TX = . $; ~ \rho=0.59 ;$ SS = 100; SSR $=1 ; \mathrm{T} 2=0$ | 0.0008 | 0.0005 | 0.0008 | 0.938 | 0.946 | 0.961 | 0.002 | 0.002 | 0.002 |
| TX = . $; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0005 | 0.001 | 0.0005 | 0.956 | 0.975 | 1 | 0.001 | 0.001 | 0.001 |
| TX = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0061 | -0.0065 | -0.0064 | 0.705 | 0.57 | 0.534 | 0.014 | 0.016 | 0.014 |
| TX = . $; ~ \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0021 | 0.0021 | 0.0021 | 0.603 | 0.581 | 0.567 | 0.012 | 0.012 | 0.012 |
| TX = . $1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0031 | -0.003 | -0.0024 | 0.52 | 0.54 | 0.564 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T}=.1$ | 0.0031 | 0.0049 | 0.0033 | 0.4 | 0.44 | 0.629 | 0.011 | 0.013 | 0.011 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | 0.0079 | 0.0054 | 0.0066 | 0.414 | 0.33 | 0.301 | 0.053 | 0.059 | 0.053 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0009 | -0.0024 | -0.001 | 0.341 | 0.335 | 0.314 | 0.052 | 0.052 | 0.052 |
| TX = . $1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | -0.0088 | -0.0096 | -0.0079 | 0.259 | 0.271 | 0.289 | 0.053 | 0.053 | 0.053 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.014 | 0.0132 | 0.0138 | 0.194 | 0.201 | 0.311 | 0.05 | 0.061 | 0.05 |
| Tx = . $; ~ \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0011 | 0.0018 | 0.0013 | 0.947 | 0.87 | 0.818 | 0.003 | 0.003 | 0.003 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0008 | 0.0008 | 0.0008 | 0.951 | 0.931 | 0.922 | 0.002 | 0.002 | 0.002 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{x}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0022 | -0.0022 | -0.0022 | 0.942 | 0.952 | 0.966 | 0.001 | 0.001 | 0.001 |
| $T x=.1 ; \rho=0.81 ; S S=100 ; S S R=2 ; T^{2}=0$ | -0.0003 | -0.0006 | -0.0004 | 0.937 | 0.953 | 0.998 | 0.001 | 0.001 | 0.001 |
| $T x=.1 ; \rho=0.00 ; S S=100 ; S S R=2 ; \tau 2=.1$ | -0.0053 | -0.0047 | -0.0052 | 0.692 | 0.583 | 0.532 | 0.011 | 0.012 | 0.011 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=.1$ | 0.0017 | 0.0015 | 0.0015 | 0.521 | 0.506 | 0.496 | 0.012 | 0.012 | 0.012 |
| Tx $=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{r} 2=.1$ | -0.0014 | -0.0019 | -0.002 | 0.474 | 0.487 | 0.506 | 0.012 | 0.012 | 0.012 |
| Tx $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{r} 2=.1$ | -0.0009 | 0.0011 | -0.0008 | 0.391 | 0.419 | 0.575 | 0.01 | 0.012 | 0.01 |
| $T x=.1 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0018 | 0.003 | 0.0016 | 0.358 | 0.289 | 0.255 | 0.056 | 0.062 | 0.056 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.5$ | 0.0009 | 0.0007 | 0.0012 | 0.29 | 0.268 | 0.268 | 0.051 | 0.052 | 0.051 |
| $T x=.1 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ t 2=.5$ | 0.0115 | 0.0126 | 0.013 | 0.251 | 0.26 | 0.288 | 0.053 | 0.054 | 0.053 |
| $T x=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0015 | -0.007 | -0.0016 | 0.159 | 0.177 | 0.26 | 0.053 | 0.061 | 0.053 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0077 | 0.0094 | 0.0076 | 0.937 | 0.86 | 0.836 | 0.021 | 0.023 | 0.02 |
| Tx = . $; ~ \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0025 | 0.0032 | 0.0038 | 0.937 | 0.931 | 0.919 | 0.013 | 0.013 | 0.013 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T}_{2}=0$ | -0.004 | -0.0036 | -0.004 | 0.941 | 0.949 | 0.961 | 0.009 | 0.009 | 0.009 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0 | -0.0018 | -0.0016 | 0.941 | 0.966 | 0.999 | 0.004 | 0.005 | 0.004 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0059 | 0.0075 | 0.0056 | 0.88 | 0.798 | 0.746 | 0.031 | 0.033 | 0.03 |
| Tx = . $5 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0032 | 0.0042 | 0.0038 | 0.837 | 0.827 | 0.823 | 0.023 | 0.023 | 0.022 |
| Tx = . $5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0014 | -0.0019 | -0.0024 | 0.788 | 0.813 | 0.851 | 0.019 | 0.019 | 0.019 |
| Tx = . $5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0024 | 0.0014 | 0.0026 | 0.665 | 0.704 | 0.89 | 0.015 | 0.018 | 0.014 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0053 | -0.0055 | -0.0076 | 0.663 | 0.561 | 0.531 | 0.078 | 0.082 | 0.075 |
| Tx = . $5 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0154 | 0.0138 | 0.0146 | 0.553 | 0.552 | 0.54 | 0.073 | 0.073 | 0.072 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.009 | -0.009 | -0.007 | 0.521 | 0.532 | 0.591 | 0.061 | 0.061 | 0.059 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0003 | 0.0019 | -0.0026 | 0.376 | 0.402 | 0.567 | 0.058 | 0.068 | 0.057 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=2 ; ~ t 2=0$ | 0.0003 | 0.0015 | 0.0007 | 0.945 | 0.869 | 0.839 | 0.015 | 0.017 | 0.015 |
| Tx = . $; ~ \rho=0.40 ; S S=20 ; S S R=2 ; ~ t 2=0$ | 0.0049 | 0.0053 | 0.0055 | 0.947 | 0.936 | 0.932 | 0.009 | 0.009 | 0.009 |
| $T x=.5 ; \rho=0.59 ; S S=20 ; S S R=2 ; \tau 2=0$ | -0.0008 | -0.0001 | 0.0001 | 0.942 | 0.947 | 0.957 | 0.006 | 0.006 | 0.006 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0018 | 0.0006 | 0.0016 | 0.941 | 0.955 | 0.999 | 0.003 | 0.003 | 0.003 |
| $T x=.5 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0012 | 0.0009 | 0.0027 | 0.85 | 0.746 | 0.726 | 0.026 | 0.028 | 0.026 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=.5 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0026 | -0.0038 | -0.0029 | 0.808 | 0.803 | 0.786 | 0.02 | 0.02 | 0.019 |
| Tx $=.5 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; \mathrm{T}^{2}=.1$ | -0.0041 | -0.0039 | -0.0046 | 0.77 | 0.784 | 0.814 | 0.016 | 0.016 | 0.016 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0014 | -0.0018 | -0.003 | 0.608 | 0.657 | 0.837 | 0.015 | 0.017 | 0.015 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=2 ; ~ t 2=.5$ | 0.0142 | 0.015 | 0.0154 | 0.637 | 0.542 | 0.488 | 0.073 | 0.078 | 0.071 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0079 | 0.0082 | 0.0082 | 0.527 | 0.532 | 0.507 | 0.06 | 0.058 | 0.058 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0138 | -0.0141 | -0.0138 | 0.446 | 0.468 | 0.492 | 0.063 | 0.064 | 0.062 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0087 | 0.0177 | 0.0077 | 0.32 | 0.36 | 0.526 | 0.054 | 0.069 | 0.053 |
| Tx $=.5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ \mathrm{~T} 2=0$ | -0.0065 | -0.007 | -0.0066 | 0.938 | 0.853 | 0.831 | 0.008 | 0.009 | 0.008 |
| Tx $=.5 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0012 | 0.0015 | 0.0016 | 0.941 | 0.931 | 0.914 | 0.005 | 0.005 | 0.005 |
| Tx $=.5 ; \rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.001 | -0.0009 | -0.0011 | 0.95 | 0.962 | 0.967 | 0.003 | 0.003 | 0.003 |
| Tx $=.5 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0004 | -0.0008 | -0.0006 | 0.948 | 0.969 | 0.999 | 0.002 | 0.002 | 0.002 |
| Tx = . $; ~ \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0053 | -0.0048 | -0.0056 | 0.787 | 0.68 | 0.64 | 0.018 | 0.02 | 0.018 |
| Tx = . $; ~ \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0029 | -0.0027 | -0.0031 | 0.743 | 0.716 | 0.694 | 0.015 | 0.015 | 0.015 |
| Tx = . $; ~ \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0032 | 0.0029 | 0.0027 | 0.666 | 0.683 | 0.709 | 0.013 | 0.014 | 0.013 |
| Tx = . $; ~ \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0077 | 0.0072 | 0.0089 | 0.511 | 0.566 | 0.745 | 0.012 | 0.014 | 0.012 |
| Tx $=.5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0043 | 0.0031 | 0.0034 | 0.546 | 0.444 | 0.407 | 0.055 | 0.061 | 0.055 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0094 | -0.0099 | -0.0089 | 0.446 | 0.413 | 0.423 | 0.055 | 0.055 | 0.055 |
| Tx $=.5 ; \rho=0.59 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0016 | 0.0004 | 0.0018 | 0.367 | 0.378 | 0.397 | 0.054 | 0.054 | 0.054 |
| Tx = . $; ~ \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0116 | 0.0178 | 0.011 | 0.253 | 0.301 | 0.414 | 0.054 | 0.062 | 0.054 |
| Tx = . $; ~ \rho=0.00 ;$ SS = 50; SSR $=2 ; \mathrm{T} 2=0$ | -0.001 | -0.0002 | -0.0007 | 0.948 | 0.875 | 0.84 | 0.006 | 0.007 | 0.006 |
| Tx = . $; ~ \rho=0.40 ; S S=50 ; S S R=2 ; ~ t 2=0$ | 0.0013 | 0.0017 | 0.0015 | 0.952 | 0.944 | 0.938 | 0.003 | 0.003 | 0.003 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0004 | -0.0003 | -0.0006 | 0.947 | 0.953 | 0.966 | 0.003 | 0.003 | 0.003 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0002 | 0.0009 | 0.0005 | 0.942 | 0.971 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0011 | 0.0021 | 0.0007 | 0.767 | 0.648 | 0.608 | 0.016 | 0.018 | 0.016 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0038 | 0.0035 | 0.004 | 0.673 | 0.651 | 0.641 | 0.014 | 0.014 | 0.014 |
| Tx $=.5 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0014 | 0.0016 | 0.0018 | 0.641 | 0.657 | 0.684 | 0.012 | 0.012 | 0.012 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | 0.0007 | -0.0001 | 0 | 0.485 | 0.528 | 0.684 | 0.012 | 0.014 | 0.012 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0042 | -0.0051 | -0.0023 | 0.489 | 0.411 | 0.372 | 0.054 | 0.058 | 0.053 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.001 | -0.001 | -0.0013 | 0.358 | 0.342 | 0.324 | 0.056 | 0.056 | 0.056 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0118 | 0.0105 | 0.0108 | 0.348 | 0.354 | 0.374 | 0.052 | 0.053 | 0.052 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0066 | 0.0035 | 0.0065 | 0.222 | 0.248 | 0.366 | 0.05 | 0.058 | 0.049 |
| TX = . $; ~ \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0002 | -0.0008 | 0 | 0.939 | 0.864 | 0.836 | 0.004 | 0.005 | 0.004 |
| TX = . $; ~ \rho=0.40 ;$ SS = 100; SSR $=1 ; \mathrm{T} 2=0$ | -0.0012 | -0.0013 | -0.0012 | 0.943 | 0.933 | 0.918 | 0.002 | 0.002 | 0.002 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0009 | -0.001 | -0.0009 | 0.951 | 0.961 | 0.97 | 0.002 | 0.002 | 0.002 |
| Tx $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0012 | 0.0019 | 0.0011 | 0.953 | 0.972 | 1 | 0.001 | 0.001 | 0.001 |
| TX $=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T}^{2}=.1$ | -0.0013 | -0.0021 | -0.0012 | 0.709 | 0.594 | 0.535 | 0.014 | 0.015 | 0.014 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0016 | 0.0017 | 0.0017 | 0.616 | 0.594 | 0.581 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0022 | 0.002 | 0.0021 | 0.563 | 0.583 | 0.608 | 0.011 | 0.011 | 0.011 |
| TX = . $; ~ \rho=0.81 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0039 | -0.0027 | -0.004 | 0.417 | 0.452 | 0.605 | 0.011 | 0.013 | 0.011 |
| $T X=.5 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.008 | 0.009 | 0.008 | 0.422 | 0.351 | 0.318 | 0.055 | 0.061 | 0.055 |
| $T X=.5 ; \rho=0.40 ;$ SS $=100 ; S S R=1 ; ~ T 2=.5$ | 0.0081 | 0.0075 | 0.0077 | 0.313 | 0.308 | 0.297 | 0.052 | 0.053 | 0.052 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0049 | -0.0057 | -0.0058 | 0.276 | 0.295 | 0.304 | 0.054 | 0.055 | 0.054 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0086 | 0.0046 | 0.0067 | 0.199 | 0.196 | 0.332 | 0.053 | 0.065 | 0.053 |
| TX $=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | 0.003 | 0.0026 | 0.003 | 0.946 | 0.866 | 0.828 | 0.003 | 0.003 | 0.003 |
| Tx = . $; ~ \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.0023 | -0.0023 | -0.002 | 0.947 | 0.931 | 0.92 | 0.002 | 0.002 | 0.002 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0016 | -0.0016 | -0.0017 | 0.952 | 0.961 | 0.972 | 0.001 | 0.001 | 0.001 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | 0.0001 | 0.0004 | 0 | 0.958 | 0.969 | 0.998 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.007 | 0.0067 | 0.0068 | 0.643 | 0.534 | 0.5 | 0.014 | 0.015 | 0.013 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0018 | 0.0017 | 0.0017 | 0.563 | 0.546 | 0.521 | 0.011 | 0.011 | 0.011 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0042 | -0.0038 | -0.0035 | 0.474 | 0.492 | 0.516 | 0.011 | 0.011 | 0.011 |
| TX = . $; ~ \rho=0.81 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=.1$ | 0.0019 | 0.0033 | 0.0024 | 0.354 | 0.393 | 0.536 | 0.01 | 0.012 | 0.01 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0089 | -0.0029 | -0.0089 | 0.367 | 0.286 | 0.28 | 0.054 | 0.059 | 0.054 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0083 | -0.0073 | -0.0081 | 0.289 | 0.269 | 0.273 | 0.052 | 0.052 | 0.051 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0091 | -0.01 | -0.0096 | 0.23 | 0.238 | 0.246 | 0.053 | 0.053 | 0.053 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0052 | 0.0051 | 0.0059 | 0.165 | 0.176 | 0.282 | 0.051 | 0.06 | 0.051 |
| TX $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0056 | -0.0062 | -0.0065 | 0.948 | 0.878 | 0.849 | 0.02 | 0.021 | 0.02 |
| TX $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0032 | 0.0029 | 0.0035 | 0.948 | 0.948 | 0.942 | 0.012 | 0.012 | 0.011 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.004 | -0.0034 | -0.0028 | 0.936 | 0.957 | 0.969 | 0.009 | 0.009 | 0.009 |
| TX $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=0$ | 0.0018 | 0.0005 | 0.0019 | 0.945 | 0.973 | 0.996 | 0.004 | 0.005 | 0.004 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0045 | -0.0043 | -0.0058 | 0.864 | 0.764 | 0.727 | 0.032 | 0.034 | 0.031 |
| TX $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0066 | 0.0066 | 0.0055 | 0.831 | 0.828 | 0.809 | 0.023 | 0.022 | 0.023 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0022 | -0.0021 | -0.0036 | 0.806 | 0.833 | 0.852 | 0.019 | 0.019 | 0.019 |
| Tx = 1; $\rho=0.81 ;$ SS =20; SSR = 1; $\mathrm{T} 2=.1$ | -0.0036 | -0.0037 | -0.0022 | 0.683 | 0.714 | 0.892 | 0.015 | 0.018 | 0.015 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0015 | 0.0047 | 0.0019 | 0.714 | 0.605 | 0.57 | 0.068 | 0.073 | 0.068 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.02 | 0.0173 | 0.0162 | 0.573 | 0.575 | 0.549 | 0.063 | 0.062 | 0.062 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0024 | 0.0056 | 0.0029 | 0.511 | 0.53 | 0.534 | 0.059 | 0.06 | 0.059 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0035 | 0.0061 | 0.0054 | 0.401 | 0.422 | 0.588 | 0.059 | 0.07 | 0.059 |
| $T \mathrm{~T}=1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0023 | 0.0028 | 0.0019 | 0.922 | 0.853 | 0.815 | 0.018 | 0.019 | 0.017 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0012 | -0.0016 | -0.0018 | 0.938 | 0.93 | 0.924 | 0.009 | 0.009 | 0.009 |
| TX $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0037 | -0.0036 | -0.0044 | 0.932 | 0.944 | 0.956 | 0.007 | 0.007 | 0.006 |
| TX $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.0012 | -0.0009 | -0.0018 | 0.934 | 0.952 | 0.999 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.00 ;$ SS =20; SSR $=2 ; ~ T 2=.1$ | -0.0119 | -0.0102 | -0.0114 | 0.856 | 0.761 | 0.705 | 0.027 | 0.028 | 0.026 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0023 | 0.0021 | 0.0021 | 0.81 | 0.791 | 0.779 | 0.019 | 0.019 | 0.019 |
| Tx = 1; $\rho=0.59 ;$ SS = 20; SSR $=2 ; ~ T 2=.1$ | -0.0045 | -0.0038 | -0.0048 | 0.748 | 0.77 | 0.802 | 0.017 | 0.018 | 0.017 |
| Tx = 1; $\rho=0.81 ;$ SS = 20; SSR $=2 ; ~ T 2=.1$ | -0.0031 | -0.0015 | -0.0025 | 0.605 | 0.653 | 0.832 | 0.015 | 0.018 | 0.015 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0032 | -0.0041 | -0.0045 | 0.604 | 0.523 | 0.474 | 0.069 | 0.072 | 0.067 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{r} 2=.5$ | -0.0164 | -0.0148 | -0.014 | 0.539 | 0.528 | 0.536 | 0.06 | 0.059 | 0.058 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0006 | -0.0009 | 0 | 0.454 | 0.478 | 0.517 | 0.06 | 0.06 | 0.059 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0018 | -0.0023 | 0.0012 | 0.318 | 0.347 | 0.509 | 0.059 | 0.071 | 0.058 |
| TX $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0045 | 0.004 | 0.0045 | 0.95 | 0.886 | 0.843 | 0.008 | 0.008 | 0.008 |
| TX $=1 ; \rho=0.40 ; S S=50 ;$ SSR $=1 ; ~ T 2=0$ | -0.0016 | -0.0015 | -0.0022 | 0.953 | 0.941 | 0.934 | 0.005 | 0.005 | 0.005 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX $=1 ; \rho=0.59 ; S S=50 ;$ SSR $=1 ; ~ T 2=0$ | -0.0008 | -0.0008 | -0.0009 | 0.951 | 0.956 | 0.966 | 0.003 | 0.003 | 0.003 |
| TX $=1 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0012 | 0.001 | 0.0016 | 0.939 | 0.964 | 0.997 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ; S S=50 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0027 | -0.0021 | -0.0031 | 0.805 | 0.709 | 0.658 | 0.018 | 0.02 | 0.018 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0034 | -0.0038 | -0.0035 | 0.722 | 0.696 | 0.685 | 0.016 | 0.016 | 0.016 |
| Tx = 1; $\rho=0.59 ;$ SS = $50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0002 | -0.0003 | -0.0001 | 0.64 | 0.673 | 0.689 | 0.015 | 0.015 | 0.014 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0029 | 0.0035 | 0.0031 | 0.506 | 0.547 | 0.731 | 0.012 | 0.015 | 0.012 |
| TX $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0 | 0.0003 | 0.0009 | 0.52 | 0.434 | 0.402 | 0.063 | 0.067 | 0.062 |
| TX $=1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0134 | -0.0131 | -0.0143 | 0.442 | 0.432 | 0.408 | 0.054 | 0.054 | 0.053 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0021 | 0.001 | 0.0014 | 0.365 | 0.391 | 0.409 | 0.054 | 0.054 | 0.053 |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0106 | 0.0081 | 0.0106 | 0.28 | 0.297 | 0.435 | 0.05 | 0.061 | 0.049 |
| TX $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0032 | 0.0031 | 0.0037 | 0.954 | 0.869 | 0.843 | 0.006 | 0.007 | 0.006 |
| TX $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0008 | -0.0009 | -0.0005 | 0.948 | 0.938 | 0.929 | 0.003 | 0.003 | 0.003 |
| TX $=1 ; \rho=0.59 ; S S=50 ;$ SSR $=2 ; ~ T 2=0$ | -0.0013 | -0.0014 | -0.001 | 0.935 | 0.949 | 0.959 | 0.003 | 0.003 | 0.003 |
| TX $=1 ; \rho=0.81 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0001 | 0 | -0.0003 | 0.939 | 0.961 | 0.997 | 0.001 | 0.001 | 0.001 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0014 | -0.0029 | -0.0015 | 0.743 | 0.631 | 0.608 | 0.017 | 0.019 | 0.017 |
| Tx = 1; $\rho=0.40 ;$ SS = 50; SSR $=2 ; \mathrm{T} 2=.1$ | 0.0019 | 0.0019 | 0.0022 | 0.679 | 0.661 | 0.654 | 0.013 | 0.014 | 0.013 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; ~ S S R=2 ; ~ T 2=.1$ | 0.0015 | 0.0015 | 0.0018 | 0.585 | 0.606 | 0.627 | 0.014 | 0.014 | 0.014 |
| TX = 1; $\rho=0.81 ;$ SS = 50; SSR $=2 ; \mathrm{T} 2=.1$ | -0.0008 | -0.0023 | -0.0014 | 0.484 | 0.504 | 0.707 | 0.011 | 0.014 | 0.011 |
| TX $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0044 | 0.0075 | 0.003 | 0.481 | 0.394 | 0.345 | 0.057 | 0.062 | 0.057 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0174 | 0.0177 | 0.0175 | 0.397 | 0.379 | 0.357 | 0.05 | 0.05 | 0.05 |
| TX $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.004 | 0.0042 | 0.0036 | 0.317 | 0.339 | 0.366 | 0.052 | 0.052 | 0.051 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0003 | 0.0039 | 0.0002 | 0.238 | 0.267 | 0.375 | 0.053 | 0.064 | 0.053 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0018 | 0.0017 | 0.0021 | 0.938 | 0.859 | 0.836 | 0.004 | 0.005 | 0.004 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0033 | -0.0031 | -0.0032 | 0.942 | 0.925 | 0.915 | 0.003 | 0.003 | 0.003 |
| Tx $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0015 | 0.0019 | 0.0017 | 0.959 | 0.965 | 0.975 | 0.002 | 0.002 | 0.002 |
| TX $=1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0013 | -0.0016 | -0.0012 | 0.954 | 0.962 | 0.999 | 0.001 | 0.001 | 0.001 |
| TX = 1; $\rho=0.00 ;$ SS = $100 ;$ SSR $=1 ; ~ T 2=.1$ | 0.002 | 0.0015 | 0.0021 | 0.702 | 0.582 | 0.533 | 0.014 | 0.015 | 0.014 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{X}=1 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0003 | 0 | 0.0002 | 0.609 | 0.582 | 0.567 | 0.013 | 0.013 | 0.013 |
| $T x=1 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0013 | -0.0015 | -0.0015 | 0.507 | 0.53 | 0.558 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{X}=1 ; \rho=0.81 ;$ SS $=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0037 | 0.0038 | 0.0037 | 0.375 | 0.411 | 0.57 | 0.011 | 0.014 | 0.011 |
| $T \mathrm{X}=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0062 | 0.012 | 0.0069 | 0.383 | 0.322 | 0.288 | 0.053 | 0.059 | 0.053 |
| $T \mathrm{X}=1 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0113 | 0.0116 | 0.0104 | 0.308 | 0.291 | 0.283 | 0.056 | 0.057 | 0.056 |
| TX $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0037 | 0.0034 | 0.0046 | 0.257 | 0.273 | 0.283 | 0.053 | 0.054 | 0.053 |
| TX $=1 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0041 | -0.0062 | -0.0042 | 0.207 | 0.225 | 0.328 | 0.048 | 0.057 | 0.048 |
| TX $=1 ; \rho=0.00 ;$ SS $=100 ; S S R=2 ; \mathrm{T}^{2}=0$ | 0.0006 | -0.0002 | 0.0004 | 0.945 | 0.861 | 0.831 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{r}^{2}=0$ | 0.002 | 0.002 | 0.0017 | 0.951 | 0.94 | 0.933 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}_{2}=0$ | -0.0013 | -0.0017 | -0.0013 | 0.947 | 0.954 | 0.964 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.81 ;$ SS =100; SSR $=2 ; \mathrm{T} 2=0$ | 0.0005 | 0.0004 | 0.0003 | 0.951 | 0.968 | 1 | 0.001 | 0.001 | 0.001 |
| TX $=1 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.0008 | -0.0007 | -0.0001 | 0.635 | 0.545 | 0.505 | 0.013 | 0.015 | 0.013 |
| Tx $=1 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0042 | -0.0037 | -0.0044 | 0.578 | 0.554 | 0.533 | 0.011 | 0.011 | 0.011 |
| Tx $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0013 | 0.0007 | 0.0009 | 0.482 | 0.504 | 0.534 | 0.011 | 0.011 | 0.011 |
| Tx $=1 ; \rho=0.81 ;$ SS = 100; SSR $=2 ; ~ T 2=.1$ | 0.0021 | 0.0029 | 0.0017 | 0.332 | 0.388 | 0.53 | 0.011 | 0.013 | 0.011 |
| $T \mathrm{X}=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0019 | -0.0037 | -0.0019 | 0.344 | 0.27 | 0.237 | 0.054 | 0.061 | 0.054 |
| $T \mathrm{X}=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0044 | 0.0046 | 0.0044 | 0.299 | 0.29 | 0.278 | 0.052 | 0.053 | 0.053 |
| TX $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0004 | -0.0007 | -0.0006 | 0.245 | 0.25 | 0.27 | 0.051 | 0.052 | 0.051 |
| $T \mathrm{X}=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.004 | 0.0043 | 0.0044 | 0.158 | 0.179 | 0.255 | 0.051 | 0.06 | 0.051 |
| TX $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0043 | 0.0027 | 0.0042 | 0.93 | 0.871 | 0.83 | 0.027 | 0.028 | 0.026 |
| TX $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0 | -0.0007 | -0.0007 | 0.941 | 0.933 | 0.927 | 0.015 | 0.015 | 0.015 |
| TX $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0025 | 0.0027 | 0.0031 | 0.942 | 0.95 | 0.964 | 0.011 | 0.011 | 0.011 |
| TX $=0 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=0$ | 0.0041 | 0.0041 | 0.004 | 0.941 | 0.958 | 0.997 | 0.006 | 0.007 | 0.006 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0112 | -0.0132 | -0.0113 | 0.894 | 0.809 | 0.757 | 0.036 | 0.037 | 0.035 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0045 | -0.0036 | -0.0042 | 0.864 | 0.863 | 0.85 | 0.025 | 0.025 | 0.024 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0075 | -0.0077 | -0.0076 | 0.811 | 0.83 | 0.866 | 0.023 | 0.022 | 0.022 |
| TX $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0014 | -0.0018 | -0.0018 | 0.721 | 0.761 | 0.91 | 0.017 | 0.02 | 0.017 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0132 | -0.0124 | -0.0118 | 0.722 | 0.622 | 0.581 | 0.079 | 0.084 | 0.077 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0133 | -0.0118 | -0.0135 | 0.633 | 0.614 | 0.603 | 0.069 | 0.069 | 0.068 |
| $T \mathrm{~T}=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0161 | 0.0141 | 0.0132 | 0.559 | 0.579 | 0.604 | 0.067 | 0.068 | 0.066 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.009 | -0.0142 | -0.0096 | 0.445 | 0.506 | 0.635 | 0.057 | 0.064 | 0.057 |
| Tx $=0 ; \rho=0.00 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | 0.0016 | 0.0027 | 0.0017 | 0.943 | 0.886 | 0.848 | 0.018 | 0.018 | 0.017 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0024 | -0.0026 | -0.0022 | 0.94 | 0.932 | 0.922 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0005 | 0.0005 | 0.0009 | 0.939 | 0.948 | 0.963 | 0.008 | 0.008 | 0.007 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0035 | -0.0041 | -0.0042 | 0.935 | 0.955 | 0.995 | 0.004 | 0.005 | 0.004 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0051 | -0.0065 | -0.0059 | 0.866 | 0.798 | 0.74 | 0.027 | 0.029 | 0.026 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0163 | -0.0172 | -0.0168 | 0.828 | 0.811 | 0.795 | 0.021 | 0.021 | 0.021 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ; S S R=2 ; ~ T 2=.1$ | -0.0001 | 0.0017 | 0.0021 | 0.772 | 0.795 | 0.82 | 0.02 | 0.019 | 0.019 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0018 | 0.0015 | 0.001 | 0.678 | 0.732 | 0.874 | 0.014 | 0.016 | 0.014 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; T 2=.5$ | 0.0003 | -0.0037 | -0.0001 | 0.657 | 0.553 | 0.513 | 0.073 | 0.077 | 0.073 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; T 2=.5$ | 0.0021 | 0.003 | 0.0046 | 0.567 | 0.555 | 0.549 | 0.061 | 0.06 | 0.059 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.005 | 0.0043 | 0.0048 | 0.517 | 0.539 | 0.549 | 0.059 | 0.058 | 0.057 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0037 | 0.005 | 0.0006 | 0.385 | 0.414 | 0.565 | 0.054 | 0.064 | 0.053 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0019 | 0.0025 | 0.0016 | 0.946 | 0.868 | 0.824 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0016 | -0.0014 | -0.0015 | 0.949 | 0.942 | 0.922 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; T 2=0$ | 0.0003 | 0.0005 | 0.0007 | 0.949 | 0.955 | 0.973 | 0.004 | 0.005 | 0.004 |
| Tx $=0 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=0$ | -0.001 | -0.0007 | -0.001 | 0.949 | 0.965 | 0.998 | 0.002 | 0.003 | 0.002 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0047 | -0.0039 | -0.0044 | 0.835 | 0.722 | 0.674 | 0.02 | 0.021 | 0.02 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0033 | -0.0036 | -0.004 | 0.775 | 0.752 | 0.74 | 0.015 | 0.015 | 0.015 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0004 | 0.0003 | -0.0005 | 0.722 | 0.743 | 0.771 | 0.014 | 0.014 | 0.014 |
| Tx $=0 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.001 | 0.0026 | 0.0008 | 0.584 | 0.624 | 0.785 | 0.012 | 0.014 | 0.012 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0136 | -0.0138 | -0.013 | 0.58 | 0.474 | 0.415 | 0.054 | 0.058 | 0.054 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0042 | -0.0049 | -0.004 | 0.474 | 0.464 | 0.445 | 0.056 | 0.056 | 0.055 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0047 | -0.0041 | -0.0047 | 0.449 | 0.461 | 0.482 | 0.05 | 0.051 | 0.05 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0096 | -0.0089 | -0.009 | 0.292 | 0.314 | 0.461 | 0.054 | 0.062 | 0.054 |
| TX $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0011 | 0.0001 | -0.001 | 0.946 | 0.878 | 0.843 | 0.007 | 0.008 | 0.007 |
| TX $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.002 | -0.0017 | -0.0018 | 0.944 | 0.934 | 0.921 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0001 | -0.0001 | 0.0003 | 0.949 | 0.958 | 0.966 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.81 ;$ SS =50; SSR $=2 ;$ T2 $=0$ | -0.0002 | -0.001 | -0.0001 | 0.945 | 0.965 | 0.999 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.00 ;$ SS $=50 ;$ SSR $=2 ; ~$ 2 $2=.1$ | 0.0031 | 0.0029 | 0.0029 | 0.765 | 0.662 | 0.597 | 0.018 | 0.02 | 0.018 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0034 | -0.0032 | -0.0029 | 0.674 | 0.671 | 0.64 | 0.016 | 0.016 | 0.016 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0018 | -0.0018 | -0.0018 | 0.644 | 0.668 | 0.69 | 0.014 | 0.014 | 0.014 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0049 | -0.0038 | -0.0051 | 0.519 | 0.572 | 0.733 | 0.011 | 0.013 | 0.011 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0 | -0.0017 | 0.0003 | 0.524 | 0.427 | 0.399 | 0.057 | 0.063 | 0.056 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0014 | 0.0014 | 0.0018 | 0.411 | 0.398 | 0.385 | 0.056 | 0.056 | 0.056 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0043 | -0.006 | -0.0036 | 0.331 | 0.337 | 0.361 | 0.055 | 0.055 | 0.054 |
| Tx $=0 ; \rho=0.81 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0097 | 0.0136 | 0.01 | 0.242 | 0.272 | 0.382 | 0.053 | 0.061 | 0.053 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0012 | 0.0012 | 0.0011 | 0.96 | 0.891 | 0.844 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0011 | 0.0011 | 0.0013 | 0.938 | 0.932 | 0.916 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0011 | -0.0013 | -0.0013 | 0.94 | 0.957 | 0.967 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0006 | -0.0001 | -0.0006 | 0.953 | 0.962 | 0.998 | 0.001 | 0.001 | 0.001 |
| TX $=0 ; \rho=0.00 ; ~ S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0026 | -0.0015 | -0.0026 | 0.731 | 0.623 | 0.572 | 0.016 | 0.017 | 0.016 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0006 | 0.0006 | 0.0006 | 0.629 | 0.612 | 0.593 | 0.013 | 0.013 | 0.013 |
| TX $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~$ 2 $2=.1$ | -0.003 | -0.0029 | -0.0034 | 0.534 | 0.558 | 0.587 | 0.014 | 0.014 | 0.014 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0005 | -0.0005 | 0.0009 | 0.457 | 0.501 | 0.66 | 0.011 | 0.013 | 0.011 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.018 | 0.0166 | 0.0179 | 0.441 | 0.361 | 0.325 | 0.056 | 0.061 | 0.056 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0026 | -0.0019 | -0.0012 | 0.359 | 0.353 | 0.335 | 0.052 | 0.052 | 0.052 |
| TX $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~$ 2 $2=.5$ | -0.0011 | 0.0006 | -0.0007 | 0.334 | 0.365 | 0.367 | 0.049 | 0.049 | 0.049 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0001 | 0.0006 | 0.0004 | 0.206 | 0.236 | 0.321 | 0.05 | 0.059 | 0.05 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0038 | 0.0032 | 0.0038 | 0.942 | 0.874 | 0.846 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ; S S R=2 ; ~ T 2=0$ | -0.0003 | -0.0005 | -0.0001 | 0.949 | 0.938 | 0.929 | 0.002 | 0.002 | 0.002 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0027 | -0.0028 | -0.0027 | 0.953 | 0.961 | 0.967 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0005 | 0.0007 | 0.0005 | 0.949 | 0.968 | 1 | 0.001 | 0.001 | 0.001 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.0003 | -0.0018 | -0.0007 | 0.695 | 0.595 | 0.551 | 0.013 | 0.014 | 0.013 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0032 | 0.0039 | 0.0032 | 0.585 | 0.553 | 0.532 | 0.012 | 0.013 | 0.012 |
| TX $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0003 | -0.0001 | -0.0002 | 0.488 | 0.507 | 0.535 | 0.012 | 0.012 | 0.012 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.0018 | 0.0002 | -0.0023 | 0.374 | 0.405 | 0.595 | 0.01 | 0.013 | 0.01 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0052 | 0.0053 | 0.0049 | 0.393 | 0.315 | 0.294 | 0.053 | 0.058 | 0.053 |
| TX $=0 ; \rho=0.40 ;$ SS $=100 ; S S R=2 ; ~ T 2=.5$ | -0.0115 | -0.012 | -0.0113 | 0.308 | 0.282 | 0.277 | 0.051 | 0.051 | 0.051 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ; S S R=2 ; ~ T 2=.5$ | -0.0007 | -0.0014 | -0.0013 | 0.28 | 0.292 | 0.305 | 0.049 | 0.049 | 0.048 |
| TX $=0 ; \rho=0.81 ;$ SS $=100 ; S S R=2 ; ~ T 2=.5$ | 0.0029 | 0.0059 | 0.0024 | 0.163 | 0.193 | 0.274 | 0.051 | 0.06 | 0.052 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0007 | 0 | 0.0003 | 0.93 | 0.839 | 0.814 | 0.028 | 0.031 | 0.028 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0055 | -0.007 | -0.0059 | 0.927 | 0.921 | 0.92 | 0.017 | 0.017 | 0.017 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0075 | 0.0082 | 0.0085 | 0.921 | 0.939 | 0.948 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0001 | -0.0001 | -0.0006 | 0.927 | 0.954 | 0.989 | 0.006 | 0.007 | 0.006 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0016 | 0.0013 | -0.0013 | 0.876 | 0.794 | 0.759 | 0.038 | 0.041 | 0.037 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0046 | 0.0039 | 0.0033 | 0.837 | 0.829 | 0.822 | 0.029 | 0.028 | 0.028 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0059 | 0.0059 | 0.0054 | 0.838 | 0.855 | 0.867 | 0.022 | 0.022 | 0.022 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0058 | 0.0067 | 0.0057 | 0.744 | 0.791 | 0.913 | 0.016 | 0.018 | 0.016 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0112 | 0.0099 | 0.0097 | 0.721 | 0.608 | 0.584 | 0.074 | 0.079 | 0.072 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0128 | -0.0134 | -0.0125 | 0.637 | 0.623 | 0.602 | 0.073 | 0.071 | 0.072 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.01 | -0.0104 | -0.0099 | 0.587 | 0.594 | 0.633 | 0.06 | 0.063 | 0.061 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0068 | 0.0011 | 0.0039 | 0.439 | 0.492 | 0.635 | 0.057 | 0.065 | 0.056 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0021 | 0.0021 | 0.0025 | 0.937 | 0.871 | 0.835 | 0.018 | 0.019 | 0.018 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0007 | -0.0009 | -0.0009 | 0.947 | 0.942 | 0.941 | 0.011 | 0.011 | 0.01 |
| $T x=.1 ; \rho=0.59 ; S S=20 ; S S R=2 ; \tau 2=0$ | -0.0007 | -0.0007 | -0.0009 | 0.934 | 0.951 | 0.964 | 0.008 | 0.008 | 0.008 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0021 | -0.0048 | -0.0025 | 0.951 | 0.972 | 0.998 | 0.004 | 0.004 | 0.004 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0063 | -0.0066 | -0.0065 | 0.89 | 0.806 | 0.74 | 0.027 | 0.028 | 0.026 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{T} x=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0037 | 0.0049 | 0.0048 | 0.813 | 0.791 | 0.792 | 0.022 | 0.022 | 0.022 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0048 | -0.0042 | -0.0043 | 0.793 | 0.809 | 0.835 | 0.018 | 0.018 | 0.018 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0009 | 0.0004 | 0.0009 | 0.677 | 0.726 | 0.874 | 0.014 | 0.016 | 0.014 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0179 | 0.0126 | 0.0185 | 0.649 | 0.541 | 0.505 | 0.071 | 0.077 | 0.07 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0036 | 0.0026 | 0.0027 | 0.56 | 0.541 | 0.525 | 0.064 | 0.063 | 0.063 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0058 | 0.0063 | 0.0058 | 0.529 | 0.54 | 0.569 | 0.059 | 0.06 | 0.058 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0094 | 0.0053 | 0.0096 | 0.36 | 0.388 | 0.533 | 0.06 | 0.069 | 0.059 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T}_{2}=0$ | 0.0023 | 0.0008 | 0.0015 | 0.941 | 0.881 | 0.831 | 0.01 | 0.011 | 0.01 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0015 | 0.0012 | 0.0011 | 0.947 | 0.932 | 0.919 | 0.006 | 0.006 | 0.006 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0024 | -0.0024 | -0.0021 | 0.945 | 0.96 | 0.965 | 0.004 | 0.004 | 0.004 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0007 | 0.0006 | 0.0006 | 0.93 | 0.951 | 0.995 | 0.002 | 0.003 | 0.002 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0009 | 0.0031 | 0.001 | 0.804 | 0.715 | 0.666 | 0.021 | 0.024 | 0.021 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0014 | -0.0018 | -0.0015 | 0.739 | 0.72 | 0.701 | 0.017 | 0.017 | 0.017 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0014 | -0.0008 | -0.0006 | 0.685 | 0.699 | 0.722 | 0.017 | 0.017 | 0.017 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0072 | 0.0073 | 0.0069 | 0.599 | 0.671 | 0.798 | 0.012 | 0.013 | 0.012 |
| $T x=.1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0069 | -0.0044 | -0.0067 | 0.577 | 0.482 | 0.439 | 0.06 | 0.064 | 0.06 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0083 | 0.0074 | 0.0064 | 0.451 | 0.435 | 0.428 | 0.059 | 0.06 | 0.059 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0005 | 0.0015 | -0.0004 | 0.422 | 0.433 | 0.45 | 0.056 | 0.056 | 0.054 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0006 | 0.0075 | 0.0013 | 0.321 | 0.352 | 0.473 | 0.049 | 0.058 | 0.049 |
| Tx = . $1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0046 | 0.0044 | 0.0041 | 0.954 | 0.89 | 0.85 | 0.007 | 0.007 | 0.006 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=0$ | -0.0007 | -0.0005 | -0.0004 | 0.942 | 0.93 | 0.921 | 0.004 | 0.004 | 0.004 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0015 | -0.0017 | -0.0016 | 0.943 | 0.951 | 0.977 | 0.003 | 0.003 | 0.003 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0004 | 0.0007 | 0.0005 | 0.943 | 0.968 | 0.996 | 0.002 | 0.002 | 0.002 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0006 | -0.0004 | -0.0008 | 0.785 | 0.663 | 0.628 | 0.018 | 0.02 | 0.018 |
| $T x=.1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.002 | 0.0019 | 0.0016 | 0.703 | 0.682 | 0.663 | 0.015 | 0.016 | 0.015 |
| $T x=.1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0008 | 0.0008 | 0.0005 | 0.659 | 0.688 | 0.704 | 0.013 | 0.013 | 0.013 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0018 | 0.0024 | 0.0024 | 0.495 | 0.538 | 0.717 | 0.012 | 0.014 | 0.012 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.002 | -0.0045 | -0.0031 | 0.519 | 0.406 | 0.391 | 0.057 | 0.063 | 0.056 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0202 | 0.0201 | 0.0203 | 0.397 | 0.37 | 0.355 | 0.055 | 0.055 | 0.054 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0053 | 0.0048 | 0.005 | 0.37 | 0.384 | 0.4 | 0.049 | 0.049 | 0.048 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0101 | -0.0079 | -0.0109 | 0.269 | 0.298 | 0.392 | 0.054 | 0.063 | 0.054 |
| Tx $=.1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0029 | -0.0026 | -0.003 | 0.958 | 0.886 | 0.849 | 0.005 | 0.005 | 0.005 |
| Tx $=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0028 | 0.0029 | 0.0029 | 0.92 | 0.912 | 0.902 | 0.003 | 0.003 | 0.003 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0003 | 0.0003 | 0.0003 | 0.952 | 0.96 | 0.971 | 0.002 | 0.002 | 0.002 |
| $T x=.1 ; \rho=0.81 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0001 | -0.0003 | 0.0002 | 0.951 | 0.973 | 0.994 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0012 | -0.0004 | -0.0005 | 0.722 | 0.609 | 0.584 | 0.016 | 0.017 | 0.016 |
| $T x=.1 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0038 | -0.0034 | -0.0033 | 0.638 | 0.623 | 0.603 | 0.014 | 0.014 | 0.014 |
| $T x=.1 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0018 | 0.0021 | 0.0017 | 0.575 | 0.592 | 0.624 | 0.013 | 0.013 | 0.013 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0025 | -0.0036 | -0.0028 | 0.458 | 0.498 | 0.65 | 0.011 | 0.012 | 0.011 |
| $T x=.1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0183 | -0.0178 | -0.0183 | 0.439 | 0.332 | 0.322 | 0.058 | 0.065 | 0.058 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0 | 0.0012 | -0.0001 | 0.376 | 0.357 | 0.344 | 0.051 | 0.052 | 0.051 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.001 | 0.0002 | 0.001 | 0.326 | 0.353 | 0.35 | 0.053 | 0.053 | 0.053 |
| Tx $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0011 | -0.0024 | -0.0008 | 0.242 | 0.263 | 0.35 | 0.051 | 0.058 | 0.051 |
| Tx $=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0005 | 0.0004 | 0.0006 | 0.952 | 0.873 | 0.829 | 0.004 | 0.004 | 0.003 |
| $T x=.1 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0008 | 0.0009 | 0.0006 | 0.958 | 0.947 | 0.94 | 0.002 | 0.002 | 0.002 |
| $T x=.1 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=0$ | -0.0015 | -0.0016 | -0.0015 | 0.946 | 0.958 | 0.971 | 0.002 | 0.002 | 0.002 |
| Tx $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{r} 2=0$ | 0.0005 | 0.0008 | 0.0006 | 0.942 | 0.974 | 0.996 | 0.001 | 0.001 | 0.001 |
| $T x=.1 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.0037 | -0.005 | -0.0035 | 0.694 | 0.559 | 0.509 | 0.013 | 0.014 | 0.014 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0062 | -0.0064 | -0.0061 | 0.592 | 0.569 | 0.561 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0024 | 0.0023 | 0.0024 | 0.527 | 0.545 | 0.568 | 0.012 | 0.012 | 0.012 |
| Tx $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{r} 2=.1$ | -0.0004 | 0.0015 | -0.0004 | 0.424 | 0.46 | 0.603 | 0.01 | 0.012 | 0.01 |
| $T x=.1 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ t 2=.5$ | 0.0049 | 0.0019 | 0.0043 | 0.376 | 0.293 | 0.267 | 0.052 | 0.057 | 0.052 |
| $T \mathrm{x}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0028 | -0.0023 | -0.0023 | 0.306 | 0.295 | 0.296 | 0.053 | 0.053 | 0.052 |
| $T x=.1 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0018 | 0.0018 | 0.0012 | 0.254 | 0.275 | 0.28 | 0.052 | 0.052 | 0.052 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{TX}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.011 | -0.0117 | -0.0094 | 0.195 | 0.196 | 0.292 | 0.05 | 0.058 | 0.05 |
| Tx = .5; $\rho=0.00 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0026 | 0.0035 | 0.0026 | 0.926 | 0.861 | 0.823 | 0.027 | 0.029 | 0.027 |
| Tx = . $; ~ \rho=0.40 ;$ SS $=20 ; S S R=1 ; ~ T 2=0$ | 0.0064 | 0.0055 | 0.006 | 0.927 | 0.918 | 0.913 | 0.017 | 0.016 | 0.016 |
| Tx = . $; ~ \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0077 | 0.0079 | 0.0087 | 0.941 | 0.945 | 0.964 | 0.011 | 0.011 | 0.011 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0011 | -0.0012 | -0.0018 | 0.946 | 0.967 | 0.998 | 0.006 | 0.006 | 0.005 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0092 | 0.0094 | 0.0076 | 0.881 | 0.792 | 0.754 | 0.038 | 0.041 | 0.037 |
| Tx = . $5 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0065 | 0.0056 | 0.0056 | 0.849 | 0.843 | 0.827 | 0.026 | 0.026 | 0.026 |
| Tx = . $5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.006 | -0.005 | -0.0057 | 0.812 | 0.82 | 0.848 | 0.023 | 0.024 | 0.023 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0013 | -0.0002 | -0.0002 | 0.73 | 0.777 | 0.917 | 0.016 | 0.019 | 0.016 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0026 | 0.0016 | 0.0019 | 0.726 | 0.618 | 0.585 | 0.076 | 0.084 | 0.075 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0016 | -0.0009 | -0.0001 | 0.636 | 0.622 | 0.616 | 0.068 | 0.067 | 0.067 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0097 | -0.0072 | -0.0078 | 0.56 | 0.588 | 0.605 | 0.068 | 0.067 | 0.067 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0053 | 0.0021 | 0.0038 | 0.4 | 0.453 | 0.607 | 0.063 | 0.074 | 0.062 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=0$ | 0.0059 | 0.0062 | 0.0052 | 0.939 | 0.893 | 0.849 | 0.018 | 0.018 | 0.017 |
| Tx = . $; ~ \rho=0.40 ; S S=20 ; S S R=2 ; ~ t 2=0$ | 0.0027 | 0.0022 | 0.0023 | 0.928 | 0.924 | 0.914 | 0.012 | 0.012 | 0.011 |
| Tx $=.5 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0036 | -0.0036 | -0.0039 | 0.954 | 0.965 | 0.972 | 0.008 | 0.008 | 0.007 |
| Tx = . $; ~ \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0012 | -0.0012 | -0.001 | 0.94 | 0.977 | 0.995 | 0.004 | 0.004 | 0.004 |
| Tx $=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0047 | -0.0059 | -0.0059 | 0.851 | 0.752 | 0.722 | 0.03 | 0.032 | 0.029 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0055 | 0.0052 | 0.0054 | 0.804 | 0.786 | 0.774 | 0.023 | 0.023 | 0.022 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0024 | -0.0027 | -0.0031 | 0.811 | 0.833 | 0.85 | 0.018 | 0.017 | 0.017 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0001 | -0.0007 | 0.0018 | 0.68 | 0.736 | 0.886 | 0.013 | 0.015 | 0.013 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0005 | -0.0011 | 0.0005 | 0.654 | 0.581 | 0.531 | 0.072 | 0.077 | 0.07 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.009 | 0.0077 | 0.0073 | 0.546 | 0.534 | 0.517 | 0.066 | 0.066 | 0.064 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0013 | -0.0025 | -0.0017 | 0.52 | 0.535 | 0.561 | 0.057 | 0.058 | 0.056 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0072 | 0.0074 | 0.0076 | 0.359 | 0.403 | 0.543 | 0.058 | 0.067 | 0.059 |
| Tx = . $; ~ ¢ ~=~ 0.00 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=0$ | -0.0015 | -0.0025 | -0.0015 | 0.943 | 0.868 | 0.837 | 0.011 | 0.011 | 0.01 |
| Tx = . $; ~ \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0035 | 0.0034 | 0.0039 | 0.949 | 0.94 | 0.937 | 0.006 | 0.006 | 0.006 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0004 | 0.0005 | 0.0003 | 0.934 | 0.945 | 0.958 | 0.005 | 0.005 | 0.005 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{t} 2=0$ | -0.0001 | 0.0004 | 0.0002 | 0.953 | 0.97 | 0.999 | 0.002 | 0.003 | 0.002 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0004 | 0 | 0.0007 | 0.838 | 0.738 | 0.7 | 0.02 | 0.021 | 0.02 |
| Tx = . $5 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ \mathrm{~T} 2=.1$ | -0.0005 | -0.0006 | -0.0009 | 0.766 | 0.756 | 0.726 | 0.016 | 0.016 | 0.016 |
| Tx = $5 ; ~ \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0076 | 0.0068 | 0.0068 | 0.708 | 0.732 | 0.751 | 0.015 | 0.014 | 0.014 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0023 | 0.0045 | 0.0028 | 0.577 | 0.629 | 0.778 | 0.013 | 0.015 | 0.013 |
| $T x=.5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0037 | 0.0053 | 0.0042 | 0.585 | 0.475 | 0.449 | 0.057 | 0.06 | 0.057 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0036 | -0.0024 | -0.0026 | 0.479 | 0.464 | 0.455 | 0.058 | 0.058 | 0.058 |
| Tx = . $5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0081 | -0.0081 | -0.0074 | 0.403 | 0.431 | 0.455 | 0.053 | 0.051 | 0.052 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0168 | 0.0156 | 0.0162 | 0.279 | 0.348 | 0.446 | 0.05 | 0.057 | 0.05 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0005 | -0.0005 | 0.0007 | 0.946 | 0.891 | 0.848 | 0.007 | 0.008 | 0.007 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0002 | 0.0001 | -0.0002 | 0.937 | 0.928 | 0.922 | 0.004 | 0.004 | 0.004 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2^{2}=0$ | -0.0007 | -0.001 | -0.0007 | 0.948 | 0.959 | 0.963 | 0.003 | 0.003 | 0.003 |
| $T x=.5 ; \rho=0.81 ; S S=50 ; S S R=2 ; ~ t 2=0$ | -0.0006 | -0.0005 | -0.0004 | 0.954 | 0.977 | 1 | 0.001 | 0.002 | 0.001 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0065 | -0.0047 | -0.0062 | 0.784 | 0.673 | 0.638 | 0.017 | 0.018 | 0.016 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0004 | -0.0004 | -0.0008 | 0.713 | 0.701 | 0.685 | 0.015 | 0.015 | 0.015 |
| Tx = $5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.005 | -0.0049 | -0.0051 | 0.64 | 0.659 | 0.687 | 0.013 | 0.013 | 0.013 |
| Tx = . $5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0007 | -0.0003 | 0.0007 | 0.512 | 0.536 | 0.698 | 0.012 | 0.014 | 0.012 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0008 | 0.0012 | -0.0003 | 0.51 | 0.412 | 0.375 | 0.056 | 0.062 | 0.056 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0004 | -0.0002 | -0.0007 | 0.424 | 0.397 | 0.392 | 0.054 | 0.054 | 0.053 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0035 | 0.0034 | 0.0042 | 0.34 | 0.372 | 0.4 | 0.051 | 0.051 | 0.051 |
| Tx = . $5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0079 | 0.0047 | 0.0079 | 0.232 | 0.273 | 0.368 | 0.051 | 0.058 | 0.051 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0009 | 0.0015 | 0.0009 | 0.943 | 0.867 | 0.838 | 0.005 | 0.006 | 0.005 |
| Tx $=.5 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.002 | -0.0019 | -0.002 | 0.948 | 0.932 | 0.916 | 0.003 | 0.003 | 0.003 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0018 | 0.0016 | 0.0017 | 0.951 | 0.962 | 0.968 | 0.002 | 0.002 | 0.002 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0015 | -0.0015 | -0.0017 | 0.954 | 0.97 | 0.997 | 0.001 | 0.001 | 0.001 |
| $T X=.5 ; \rho=0.00 ; S S=100 ; S S R=1 ; T 2=.1$ | -0.0009 | -0.0004 | -0.0007 | 0.738 | 0.606 | 0.563 | 0.016 | 0.018 | 0.016 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T}=.1$ | -0.0046 | -0.0038 | $-0.0036$ | 0.661 | 0.636 | 0.617 | 0.014 | 0.014 | 0.014 |
| $T x=.5 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.001 | 0.0009 | 0.0006 | 0.574 | 0.606 | 0.623 | 0.013 | 0.013 | 0.013 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T}=.1$ | -0.001 | -0.0023 | -0.0007 | 0.48 | 0.5 | 0.668 | 0.011 | 0.013 | 0.011 |
| $T x=.5 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0072 | -0.0076 | -0.0072 | 0.439 | 0.352 | 0.344 | 0.057 | 0.061 | 0.057 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T}=.5$ | 0.0009 | -0.0002 | 0.0003 | 0.36 | 0.342 | 0.334 | 0.055 | 0.056 | 0.055 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0048 | 0.0052 | 0.0053 | 0.315 | 0.322 | 0.345 | 0.052 | 0.053 | 0.052 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T}=.5$ | -0.0018 | -0.0032 | -0.0016 | 0.222 | 0.25 | 0.327 | 0.052 | 0.06 | 0.052 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; S S=100 ; S S R=2 ; T_{2}=0$ | -0.0026 | -0.0038 | -0.0029 | 0.942 | 0.866 | 0.833 | 0.004 | 0.004 | 0.004 |
| $T \mathrm{x}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0042 | 0.004 | 0.0041 | 0.946 | 0.935 | 0.923 | 0.002 | 0.002 | 0.002 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=0$ | -0.0013 | -0.0013 | -0.0013 | 0.958 | 0.963 | 0.969 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0 | 0 | 0 | 0.94 | 0.969 | 0.994 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0053 | -0.0035 | -0.0054 | 0.693 | 0.601 | 0.535 | 0.014 | 0.014 | 0.014 |
| $T X=.5 ; \rho=0.40 ; S S=100 ; S S R=2 ; T_{2}=.1$ | 0.0038 | 0.0042 | 0.0038 | 0.603 | 0.587 | 0.573 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=.1$ | -0.006 | -0.0059 | -0.0063 | 0.493 | 0.533 | 0.54 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0019 | 0.0042 | 0.0024 | 0.381 | 0.407 | 0.57 | 0.012 | 0.014 | 0.012 |
| $T X=.5 ; \rho=0.00 ; S S=100 ; S S R=2 ; T 2=.5$ | 0.0054 | 0.0072 | 0.0051 | 0.391 | 0.308 | 0.297 | 0.052 | 0.056 | 0.051 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0001 | 0.0005 | -0.0004 | 0.313 | 0.318 | 0.298 | 0.048 | 0.048 | 0.048 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0015 | -0.0033 | -0.0011 | 0.268 | 0.274 | 0.291 | 0.053 | 0.053 | 0.053 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=.5$ | 0.0019 | 0.0037 | 0.0029 | 0.188 | 0.21 | 0.29 | 0.05 | 0.055 | 0.049 |
| TX $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.005 | 0.0057 | 0.0044 | 0.933 | 0.857 | 0.835 | 0.025 | 0.028 | 0.025 |
| TX $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0051 | 0.0034 | 0.0029 | 0.94 | 0.929 | 0.916 | 0.016 | 0.016 | 0.015 |
| TX $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0009 | -0.0014 | -0.0003 | 0.944 | 0.949 | 0.962 | 0.011 | 0.011 | 0.011 |
| TX $=1 ; \rho=0.81 ; ~ S S=20 ; ~ S S R=1 ; ~ T 2=0$ | -0.0016 | -0.002 | -0.0019 | 0.932 | 0.954 | 0.993 | 0.006 | 0.007 | 0.006 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.004 | 0.0032 | 0.0041 | 0.888 | 0.817 | 0.769 | 0.036 | 0.038 | 0.035 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0001 | -0.0005 | -0.0008 | 0.844 | 0.834 | 0.815 | 0.028 | 0.027 | 0.026 |
| Tx = 1; $\rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0044 | 0.0048 | 0.0057 | 0.804 | 0.835 | 0.865 | 0.023 | 0.022 | 0.022 |
| TX $=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0024 | 0.0042 | 0.0028 | 0.744 | 0.79 | 0.914 | 0.016 | 0.018 | 0.016 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{~T}=1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0024 | -0.0057 | 0.0017 | 0.73 | 0.622 | 0.596 | 0.074 | 0.08 | 0.072 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0157 | 0.0142 | 0.0129 | 0.646 | 0.625 | 0.617 | 0.066 | 0.067 | 0.067 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.014 | 0.0136 | 0.0103 | 0.565 | 0.588 | 0.62 | 0.066 | 0.065 | 0.065 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.007 | 0.0029 | 0.0067 | 0.421 | 0.459 | 0.6 | 0.065 | 0.073 | 0.066 |
| Tx = 1; $\rho=0.00 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | 0.0019 | 0.0022 | 0.0019 | 0.948 | 0.88 | 0.834 | 0.018 | 0.019 | 0.018 |
| Tx = 1; $\rho=0.40 ;$ SS $=20 ;$ SSR $=2 ;$ T2 $=0$ | 0.002 | 0.0022 | 0.0021 | 0.941 | 0.937 | 0.921 | 0.011 | 0.011 | 0.01 |
| TX $=1 ; \rho=0.59 ;$ SS $=20 ; S S R=2 ; ~ T 2=0$ | -0.0007 | -0.001 | -0.0009 | 0.934 | 0.95 | 0.957 | 0.008 | 0.008 | 0.008 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=0$ | -0.0018 | -0.0012 | -0.0013 | 0.936 | 0.964 | 0.999 | 0.004 | 0.005 | 0.004 |
| Tx = 1; $\rho=0.00 ;$ SS $=20 ; S S R=2 ; ~ T 2=.1$ | 0.0063 | 0.0018 | 0.0044 | 0.853 | 0.754 | 0.72 | 0.031 | 0.032 | 0.03 |
| $T x=1 ; \rho=0.40 ;$ SS $=20 ; S S R=2 ; ~ T 2=.1$ | -0.0023 | -0.0019 | -0.0025 | 0.832 | 0.814 | 0.806 | 0.02 | 0.02 | 0.02 |
| Tx = 1; $\rho=0.59 ;$ SS $=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.001 | 0.001 | 0.0001 | 0.786 | 0.809 | 0.835 | 0.018 | 0.018 | 0.018 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0019 | 0.0032 | 0.0001 | 0.678 | 0.725 | 0.883 | 0.013 | 0.016 | 0.013 |
| Tx $=1 ; \rho=0.00 ;$ SS $=20 ; S S R=2 ; ~ T 2=.5$ | -0.0039 | -0.0013 | -0.0034 | 0.66 | 0.562 | 0.507 | 0.074 | 0.078 | 0.073 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0017 | 0.002 | 0.0016 | 0.6 | 0.575 | 0.565 | 0.059 | 0.058 | 0.058 |
| $T \mathrm{X}=1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.002 | 0.0006 | 0.002 | 0.499 | 0.523 | 0.541 | 0.062 | 0.062 | 0.061 |
| $T \mathrm{~T}=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0027 | -0.0046 | -0.0049 | 0.386 | 0.429 | 0.562 | 0.06 | 0.067 | 0.06 |
| Tx $=1 ; \rho=0.00 ;$ SS $=50 ; S S R=1 ; ~ T 2=0$ | 0.0012 | 0.0013 | 0.0017 | 0.936 | 0.868 | 0.832 | 0.011 | 0.012 | 0.011 |
| $\mathrm{Tx}=1 ; \rho=0.40 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0008 | -0.0006 | -0.0008 | 0.94 | 0.924 | 0.918 | 0.007 | 0.007 | 0.007 |
| $T \mathrm{~T}=1 ; \rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0018 | -0.0018 | -0.0021 | 0.925 | 0.936 | 0.952 | 0.005 | 0.005 | 0.005 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0025 | 0.0026 | 0.0027 | 0.942 | 0.965 | 0.999 | 0.002 | 0.003 | 0.002 |
| $T \mathrm{~T}=1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0022 | -0.0028 | -0.0024 | 0.835 | 0.732 | 0.696 | 0.02 | 0.022 | 0.02 |
| $\mathrm{Tx}=1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0036 | 0.0032 | 0.0039 | 0.78 | 0.76 | 0.751 | 0.015 | 0.016 | 0.015 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0005 | 0.0005 | 0 | 0.731 | 0.741 | 0.778 | 0.014 | 0.014 | 0.014 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0005 | -0.0018 | -0.0003 | 0.594 | 0.631 | 0.782 | 0.013 | 0.015 | 0.013 |
| Tx $=1 ; \rho=0.00 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0029 | 0.0036 | 0.0023 | 0.56 | 0.466 | 0.426 | 0.064 | 0.067 | 0.064 |
| $\mathrm{Tx}=1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0042 | -0.0031 | -0.0043 | 0.468 | 0.447 | 0.444 | 0.057 | 0.057 | 0.057 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.001 | -0.001 | -0.0003 | 0.422 | 0.44 | 0.469 | 0.056 | 0.057 | 0.056 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0027 | -0.0088 | $-0.0038$ | 0.29 | 0.321 | 0.42 | 0.055 | 0.064 | 0.055 |
| $T \mathrm{~T}=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0007 | -0.0002 | 0.0005 | 0.943 | 0.874 | 0.818 | 0.008 | 0.008 | 0.008 |
| TX $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0006 | 0.0006 | 0.0004 | 0.936 | 0.921 | 0.918 | 0.005 | 0.005 | 0.004 |
| TX $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0001 | 0.0002 | 0.0001 | 0.925 | 0.946 | 0.952 | 0.003 | 0.003 | 0.003 |
| TX $=1 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=0$ | 0.0003 | -0.0001 | 0 | 0.945 | 0.964 | 1 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ; S S=50 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0007 | 0.0005 | 0.0004 | 0.771 | 0.67 | 0.614 | 0.018 | 0.019 | 0.018 |
| TX $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0015 | 0.0014 | 0.0009 | 0.687 | 0.679 | 0.663 | 0.015 | 0.015 | 0.015 |
| TX $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0017 | 0.0014 | 0.0016 | 0.663 | 0.691 | 0.707 | 0.013 | 0.013 | 0.013 |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0038 | -0.0039 | -0.0029 | 0.534 | 0.592 | 0.752 | 0.011 | 0.013 | 0.011 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0 | -0.0036 | -0.0002 | 0.486 | 0.406 | 0.375 | 0.057 | 0.062 | 0.056 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0183 | -0.0172 | -0.0169 | 0.392 | 0.373 | 0.365 | 0.061 | 0.06 | 0.059 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0051 | 0.0046 | 0.005 | 0.34 | 0.353 | 0.368 | 0.054 | 0.055 | 0.055 |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0038 | -0.0058 | -0.0051 | 0.258 | 0.297 | 0.376 | 0.058 | 0.068 | 0.058 |
| Tx $=1 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | -0.003 | -0.0033 | -0.0026 | 0.956 | 0.883 | 0.856 | 0.005 | 0.005 | 0.005 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0031 | -0.0028 | -0.0029 | 0.961 | 0.953 | 0.943 | 0.003 | 0.003 | 0.003 |
| Tx $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.001 | 0.0012 | 0.0011 | 0.945 | 0.957 | 0.968 | 0.002 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0004 | 0.0003 | 0.0005 | 0.952 | 0.967 | 0.995 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=1 ; \rho=0.00 ;$ SS = $100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0008 | -0.0013 | -0.0007 | 0.732 | 0.621 | 0.56 | 0.016 | 0.016 | 0.016 |
| $T \mathrm{X}=1 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0037 | 0.0043 | 0.0041 | 0.672 | 0.643 | 0.629 | 0.013 | 0.013 | 0.013 |
| $T \mathrm{x}=1 ; \rho=0.59 ;$ SS $=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0011 | -0.0011 | -0.0014 | 0.595 | 0.608 | 0.64 | 0.012 | 0.012 | 0.012 |
| TX $=1 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0013 | -0.0033 | -0.001 | 0.452 | 0.506 | 0.648 | 0.011 | 0.013 | 0.011 |
| $T \mathrm{X}=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0012 | 0.0024 | 0.0019 | 0.449 | 0.364 | 0.337 | 0.053 | 0.057 | 0.053 |
| $T \mathrm{X}=1 ; \rho=0.40 ;$ SS $=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0017 | 0.0014 | 0.0016 | 0.379 | 0.369 | 0.353 | 0.051 | 0.051 | 0.052 |
| $T \mathrm{X}=1 ; \rho=0.59 ;$ SS $=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0064 | -0.0064 | -0.0069 | 0.294 | 0.326 | 0.329 | 0.056 | 0.056 | 0.056 |
| Tx $=1 ; \rho=0.81 ;$ SS = 100; SSR = 1; $72=.5$ | -0.0022 | -0.0015 | -0.0027 | 0.222 | 0.245 | 0.339 | 0.052 | 0.061 | 0.052 |
| TX $=1 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.0009 | -0.0008 | -0.0008 | 0.958 | 0.864 | 0.839 | 0.004 | 0.004 | 0.004 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0002 | 0.0002 | 0.0003 | 0.939 | 0.931 | 0.92 | 0.002 | 0.002 | 0.002 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{~T}=1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0006 | 0.0007 | 0.0008 | 0.947 | 0.954 | 0.959 | 0.002 | 0.002 | 0.002 |
| $T \mathrm{~T}=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=0$ | 0.0003 | -0.0002 | 0.0003 | 0.951 | 0.964 | 1 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0037 | 0.0026 | 0.004 | 0.703 | 0.578 | 0.534 | 0.013 | 0.014 | 0.013 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1^{2}$ | 0.0029 | 0.0027 | 0.0026 | 0.621 | 0.595 | 0.579 | 0.012 | 0.012 | 0.012 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | -0.002 | -0.0018 | -0.0022 | 0.547 | 0.562 | 0.58 | 0.011 | 0.011 | 0.011 |
| TX = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | -0.0004 | 0.0004 | -0.0011 | 0.394 | 0.438 | 0.563 | 0.011 | 0.013 | 0.011 |
| $T \mathrm{~T}=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=.5$ | -0.0028 | -0.0039 | -0.0029 | 0.371 | 0.316 | 0.273 | 0.056 | 0.062 | 0.056 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=.5$ | 0.0034 | 0.0031 | 0.0033 | 0.302 | 0.293 | 0.277 | 0.055 | 0.054 | 0.055 |
| $T \mathrm{~T}=1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=.5$ | -0.0078 | -0.0079 | -0.0076 | 0.266 | 0.272 | 0.297 | 0.052 | 0.052 | 0.052 |
| $T \mathrm{~T}=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=.5$ | -0.0002 | -0.0056 | 0.0005 | 0.203 | 0.203 | 0.303 | 0.05 | 0.061 | 0.05 |

Simulation results: 10 studies per meta-analysis, random effects

| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0047 | -0.0055 | -0.0047 | 0.958 | 0.927 | 0.922 | 0.02 | 0.021 | 0.02 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ T 2=0$ | 0.005 | 0.0055 | 0.006 | 0.948 | 0.938 | 0.935 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0021 | -0.0022 | -0.0021 | 0.951 | 0.956 | 0.968 | 0.009 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | -0.0016 | -0.0024 | -0.0015 | 0.947 | 0.968 | 0.998 | 0.004 | 0.005 | 0.004 |
| TX $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0049 | -0.0037 | -0.0053 | 0.927 | 0.923 | 0.917 | 0.03 | 0.03 | 0.03 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T}=.1$ | 0.0005 | 0.0002 | 0 | 0.94 | 0.936 | 0.937 | 0.021 | 0.021 | 0.021 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0036 | 0.0028 | 0.0027 | 0.92 | 0.926 | 0.93 | 0.019 | 0.019 | 0.019 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0006 | 0.0017 | 0.0009 | 0.934 | 0.931 | 0.95 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.005 | -0.0049 | -0.0051 | 0.922 | 0.917 | 0.925 | 0.068 | 0.068 | 0.067 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0059 | 0.0056 | 0.0059 | 0.928 | 0.928 | 0.926 | 0.058 | 0.058 | 0.058 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0065 | 0.0066 | 0.0062 | 0.908 | 0.907 | 0.905 | 0.067 | 0.067 | 0.067 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0042 | -0.0033 | -0.0048 | 0.917 | 0.913 | 0.917 | 0.052 | 0.052 | 0.052 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | -0.0011 | -0.0009 | -0.0007 | 0.952 | 0.927 | 0.923 | 0.015 | 0.015 | 0.015 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | -0.0004 | -0.0006 | -0.0008 | 0.961 | 0.951 | 0.95 | 0.01 | 0.009 | 0.009 |
| $\mathrm{Tx}=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{r} 2=0$ | 0.0003 | -0.0003 | -0.0003 | 0.943 | 0.956 | 0.962 | 0.007 | 0.007 | 0.007 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | -0.0011 | -0.0024 | -0.0016 | 0.944 | 0.954 | 0.997 | 0.003 | 0.004 | 0.003 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0028 | 0.0025 | 0.0027 | 0.926 | 0.917 | 0.922 | 0.025 | 0.025 | 0.024 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0038 | -0.0039 | -0.0041 | 0.925 | 0.918 | 0.92 | 0.018 | 0.018 | 0.018 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ \tau 2=.1$ | -0.0006 | -0.0006 | -0.001 | 0.916 | 0.922 | 0.918 | 0.016 | 0.017 | 0.016 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.1$ | -0.0011 | -0.0011 | -0.0011 | 0.91 | 0.916 | 0.918 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ \tau 2=.5$ | 0.0027 | 0.0032 | 0.0024 | 0.927 | 0.925 | 0.925 | 0.062 | 0.062 | 0.062 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0117 | -0.0117 | -0.0117 | 0.937 | 0.938 | 0.935 | 0.055 | 0.055 | 0.055 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.003 | 0.0031 | 0.0031 | 0.902 | 0.908 | 0.906 | 0.058 | 0.058 | 0.058 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0194 | -0.0191 | -0.019 | 0.909 | 0.906 | 0.91 | 0.054 | 0.055 | 0.054 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0028 | 0.0031 | 0.0025 | 0.956 | 0.924 | 0.928 | 0.008 | 0.009 | 0.008 |
| $\mathrm{Tx}=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0049 | -0.0044 | -0.0046 | 0.942 | 0.938 | 0.932 | 0.005 | 0.005 | 0.005 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | 0.0003 | 0.0004 | 0.0002 | 0.96 | 0.966 | 0.972 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0009 | -0.0001 | 0.0011 | 0.949 | 0.97 | 0.997 | 0.002 | 0.002 | 0.002 |
| Tx = 0; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ \tau 2=.1$ | 0.0004 | 0.0006 | 0.0001 | 0.919 | 0.906 | 0.913 | 0.018 | 0.019 | 0.018 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ \tau 2=.1$ | -0.0039 | -0.0037 | -0.004 | 0.928 | 0.926 | 0.924 | 0.014 | 0.014 | 0.014 |
| Tx = 0; $\rho=0.59 ; S S=50 ; S S R=1 ; ~ \tau 2=.1$ | 0.0043 | 0.0042 | 0.0044 | 0.921 | 0.916 | 0.919 | 0.014 | 0.014 | 0.014 |
| TX = 0; $\rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ \tau 2=.1$ | -0.0023 | -0.0025 | -0.002 | 0.922 | 0.921 | 0.926 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ \tau 2=.5$ | 0.0103 | 0.0101 | 0.0101 | 0.916 | 0.91 | 0.916 | 0.061 | 0.061 | 0.061 |
| TX $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ \tau 2=.5$ | 0.001 | 0.001 | 0.0009 | 0.92 | 0.918 | 0.919 | 0.055 | 0.055 | 0.055 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0012 | -0.0012 | -0.0012 | 0.923 | 0.924 | 0.923 | 0.053 | 0.053 | 0.053 |
| Tx = 0; $\rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ \tau 2=.5$ | 0.0038 | 0.0039 | 0.0039 | 0.913 | 0.908 | 0.908 | 0.052 | 0.052 | 0.052 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | 0.0032 | 0.003 | 0.003 | 0.961 | 0.941 | 0.935 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | -0.0031 | -0.0034 | -0.003 | 0.965 | 0.962 | 0.955 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | 0.0017 | 0.0016 | 0.0018 | 0.964 | 0.968 | 0.971 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | -0.002 | -0.003 | -0.0019 | 0.957 | 0.98 | 0.998 | 0.001 | 0.001 | 0.001 |
| TX $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0003 | -0.0004 | -0.0001 | 0.93 | 0.923 | 0.925 | 0.015 | 0.015 | 0.015 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0009 | 0.001 | 0.001 | 0.924 | 0.92 | 0.92 | 0.014 | 0.014 | 0.014 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0018 | 0.0015 | 0.0017 | 0.911 | 0.913 | 0.913 | 0.013 | 0.013 | 0.013 |
| Tx = 0; $\rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ \tau 2=.1$ | 0.0028 | 0.003 | 0.0028 | 0.919 | 0.913 | 0.912 | 0.012 | 0.012 | 0.012 |
| TX $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0005 | -0.0004 | -0.0006 | 0.924 | 0.922 | 0.927 | 0.055 | 0.055 | 0.055 |
| TX = 0; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0009 | 0.0009 | 0.0008 | 0.92 | 0.919 | 0.92 | 0.056 | 0.056 | 0.056 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ ז 2=.5$ | 0.0057 | 0.0057 | 0.0057 | 0.903 | 0.907 | 0.904 | 0.056 | 0.056 | 0.056 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0057 | 0.0058 | 0.0058 | 0.927 | 0.926 | 0.929 | 0.048 | 0.048 | 0.048 |
| Tx = 0; $\rho=0.00 ; S S=100 ; S S R=1 ; ~ t 2=0$ | 0.0048 | 0.0044 | 0.0049 | 0.954 | 0.917 | 0.918 | 0.004 | 0.004 | 0.004 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0012 | -0.0013 | -0.0013 | 0.962 | 0.958 | 0.948 | 0.003 | 0.003 | 0.003 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0002 | 0.0003 | 0.0001 | 0.955 | 0.965 | 0.975 | 0.002 | 0.002 | 0.002 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0004 | 0.0007 | 0.0003 | 0.958 | 0.969 | 0.997 | 0.001 | 0.001 | 0.001 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.003 | 0.0028 | 0.0029 | 0.927 | 0.923 | 0.93 | 0.014 | 0.014 | 0.014 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | -0.0062 | -0.0061 | -0.0061 | 0.915 | 0.913 | 0.914 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | 0.0005 | 0.0005 | 0.0006 | 0.919 | 0.919 | 0.918 | 0.012 | 0.012 | 0.012 |
| $\mathrm{Tx}=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | -0.0017 | -0.0019 | -0.0017 | 0.9 | 0.897 | 0.9 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | -0.0008 | -0.0009 | -0.0009 | 0.91 | 0.907 | 0.91 | 0.057 | 0.057 | 0.057 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | -0.0026 | -0.0026 | -0.0026 | 0.915 | 0.918 | 0.915 | 0.052 | 0.052 | 0.052 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | 0.0089 | 0.0089 | 0.0088 | 0.923 | 0.922 | 0.922 | 0.053 | 0.053 | 0.053 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | 0.0056 | 0.0053 | 0.0056 | 0.91 | 0.908 | 0.91 | 0.049 | 0.049 | 0.049 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0013 | 0.0014 | 0.0014 | 0.966 | 0.939 | 0.927 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ \tau 2=0$ | -0.0001 | -0.0001 | -0.0001 | 0.959 | 0.958 | 0.951 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ ז 2=0$ | 0.0006 | 0.0006 | 0.0007 | 0.951 | 0.96 | 0.97 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0021 | 0.0023 | 0.0021 | 0.951 | 0.969 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.1$ | -0.0023 | -0.002 | -0.0022 | 0.919 | 0.916 | 0.916 | 0.012 | 0.012 | 0.012 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.1$ | -0.0001 | -0.0001 | -0.0001 | 0.922 | 0.92 | 0.922 | 0.012 | 0.012 | 0.012 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.1$ | 0.0012 | 0.0011 | 0.0011 | 0.924 | 0.921 | 0.92 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | -0.0015 | -0.0015 | -0.0014 | 0.916 | 0.923 | 0.917 | 0.01 | 0.01 | 0.01 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | 0.0064 | 0.0065 | 0.0065 | 0.92 | 0.919 | 0.919 | 0.052 | 0.052 | 0.052 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.5$ | -0.0101 | -0.0101 | -0.01 | 0.928 | 0.93 | 0.931 | 0.051 | 0.051 | 0.051 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.5$ | 0.0007 | 0.0006 | 0.0007 | 0.918 | 0.916 | 0.915 | 0.051 | 0.051 | 0.051 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.002 | -0.0021 | -0.002 | 0.909 | 0.912 | 0.908 | 0.056 | 0.055 | 0.056 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \tau 2=0$ | -0.0054 | -0.0056 | -0.0051 | 0.961 | 0.931 | 0.932 | 0.02 | 0.02 | 0.019 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{\tau} 2=0$ | -0.0049 | -0.0053 | -0.0051 | 0.948 | 0.946 | 0.937 | 0.013 | 0.013 | 0.013 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0004 | -0.0006 | -0.0007 | 0.953 | 0.961 | 0.971 | 0.008 | 0.008 | 0.008 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.002 | -0.0017 | -0.0024 | 0.944 | 0.96 | 0.997 | 0.004 | 0.005 | 0.004 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.1$ | 0.0083 | 0.0081 | 0.0084 | 0.931 | 0.912 | 0.911 | 0.031 | 0.032 | 0.03 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0023 | -0.0021 | -0.0015 | 0.926 | 0.926 | 0.919 | 0.023 | 0.023 | 0.023 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.1$ | 0.0052 | 0.0049 | 0.0052 | 0.937 | 0.936 | 0.937 | 0.018 | 0.018 | 0.018 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0027 | 0.0032 | 0.0027 | 0.912 | 0.906 | 0.931 | 0.014 | 0.015 | 0.014 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0066 | -0.0071 | -0.0071 | 0.928 | 0.928 | 0.929 | 0.071 | 0.07 | 0.07 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.5$ | 0.0044 | 0.0044 | 0.0042 | 0.929 | 0.929 | 0.928 | 0.06 | 0.06 | 0.06 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0044 | -0.0043 | -0.004 | 0.921 | 0.92 | 0.925 | 0.058 | 0.058 | 0.058 |
| Tx = .1; $\rho=0.81 ; ~ S S=20 ; ~ S S R=1 ; ~ 22=.5$ | 0.0064 | 0.0062 | 0.0061 | 0.912 | 0.913 | 0.912 | 0.053 | 0.053 | 0.053 |
| Tx = .1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ t 2=0$ | -0.0014 | -0.0012 | -0.0011 | 0.946 | 0.939 | 0.918 | 0.016 | 0.016 | 0.015 |
| Tx = .1; $\rho=0.40 ; S S=20 ; S S R=2 ; ~ ז 2=0$ | 0.0044 | 0.0038 | 0.0036 | 0.955 | 0.948 | 0.94 | 0.009 | 0.009 | 0.009 |
| $T x=.1 ; \rho=0.59 ; S S=20 ; S S R=2 ; \tau 2=0$ | 0.0012 | 0.002 | 0.0022 | 0.952 | 0.959 | 0.972 | 0.006 | 0.006 | 0.006 |
| $T x=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0003 | 0.0009 | -0.0002 | 0.951 | 0.969 | 1 | 0.003 | 0.004 | 0.003 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{r} 2=.1$ | -0.0027 | -0.0011 | -0.0026 | 0.922 | 0.925 | 0.908 | 0.027 | 0.027 | 0.027 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | 0.0046 | 0.0054 | 0.0056 | 0.913 | 0.917 | 0.916 | 0.02 | 0.02 | 0.019 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | -0.0007 | -0.0007 | -0.0008 | 0.927 | 0.929 | 0.926 | 0.016 | 0.016 | 0.016 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0007 | 0.0017 | 0.0012 | 0.912 | 0.907 | 0.92 | 0.014 | 0.014 | 0.014 |
| Tx = .1; $\rho=0.00 ; ~ S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0016 | -0.0025 | -0.0021 | 0.903 | 0.901 | 0.904 | 0.064 | 0.064 | 0.063 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0064 | 0.007 | 0.0069 | 0.92 | 0.926 | 0.924 | 0.061 | 0.061 | 0.061 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | -0.0004 | -0.0004 | -0.0003 | 0.906 | 0.901 | 0.905 | 0.06 | 0.06 | 0.06 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.5$ | -0.008 | -0.0079 | -0.0081 | 0.914 | 0.905 | 0.914 | 0.054 | 0.054 | 0.053 |
| Tx = .1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ \tau 2=0$ | -0.0025 | -0.0021 | -0.0024 | 0.958 | 0.924 | 0.92 | 0.009 | 0.009 | 0.008 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \tau 2=0$ | 0 | 0.0001 | 0.0005 | 0.963 | 0.964 | 0.958 | 0.005 | 0.005 | 0.005 |
| $T x=.1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ \tau 2=0$ | 0.0003 | 0 | 0.0001 | 0.957 | 0.96 | 0.971 | 0.003 | 0.003 | 0.003 |
| $T x=.1 ; \rho=0.81 ; S S=50 ; S S R=1 ; \tau 2=0$ | -0.0011 | -0.0008 | -0.0012 | 0.961 | 0.968 | 0.999 | 0.002 | 0.002 | 0.002 |
| Tx = .1; $\rho=0.00 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | 0.0049 | 0.0052 | 0.0047 | 0.934 | 0.924 | 0.924 | 0.017 | 0.017 | 0.016 |
| Tx = .1; $\rho=0.40 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | 0.0008 | 0.0008 | 0.001 | 0.898 | 0.902 | 0.901 | 0.016 | 0.016 | 0.016 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0012 | 0.001 | 0.0011 | 0.913 | 0.918 | 0.916 | 0.014 | 0.014 | 0.014 |
| Tx = .1; $\rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ 22=.1$ | -0.0069 | -0.0066 | -0.0069 | 0.917 | 0.912 | 0.915 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.00 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.5$ | -0.015 | -0.0158 | -0.015 | 0.914 | 0.921 | 0.913 | 0.055 | 0.055 | 0.055 |
| Tx = . $1 ; \rho=0.40 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.5$ | 0.0063 | 0.0062 | 0.0063 | 0.942 | 0.943 | 0.944 | 0.052 | 0.052 | 0.052 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.5$ | 0.0005 | 0.0004 | 0.0006 | 0.92 | 0.92 | 0.924 | 0.056 | 0.056 | 0.056 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0014 | 0.0012 | 0.0015 | 0.904 | 0.912 | 0.908 | 0.053 | 0.053 | 0.053 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0034 | -0.0033 | -0.0027 | 0.966 | 0.941 | 0.938 | 0.006 | 0.006 | 0.006 |
| $T x=.1 ; \rho=0.40 ; S S=50 ; S S R=2 ; \tau 2=0$ | -0.0013 | -0.0013 | -0.0016 | 0.96 | 0.954 | 0.947 | 0.003 | 0.003 | 0.003 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0022 | -0.0022 | -0.0021 | 0.961 | 0.964 | 0.976 | 0.003 | 0.003 | 0.003 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | -0.0005 | 0 | -0.0005 | 0.966 | 0.972 | 0.999 | 0.001 | 0.001 | 0.001 |
| TX $=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | 0.0019 | 0.0023 | 0.0018 | 0.915 | 0.911 | 0.91 | 0.017 | 0.017 | 0.017 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | -0.0003 | -0.0003 | -0.0004 | 0.93 | 0.931 | 0.931 | 0.013 | 0.013 | 0.013 |
| $\mathrm{TX}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | 0.0007 | 0.0009 | 0.0008 | 0.916 | 0.917 | 0.917 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{x}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{r} 2=.1$ | 0.0011 | 0.0012 | 0.001 | 0.906 | 0.904 | 0.91 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{x}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{r} 2=.5$ | -0.0061 | -0.006 | -0.0059 | 0.917 | 0.914 | 0.914 | 0.056 | 0.056 | 0.056 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0032 | 0.0032 | 0.0033 | 0.931 | 0.929 | 0.932 | 0.052 | 0.052 | 0.052 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.003 | 0.0029 | 0.0028 | 0.91 | 0.909 | 0.91 | 0.055 | 0.055 | 0.055 |
| $\mathrm{TX}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0012 | -0.0012 | -0.0013 | 0.923 | 0.926 | 0.926 | 0.049 | 0.049 | 0.049 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0012 | 0.0018 | 0.0014 | 0.954 | 0.926 | 0.922 | 0.004 | 0.004 | 0.004 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0006 | -0.0005 | -0.0007 | 0.954 | 0.945 | 0.939 | 0.002 | 0.002 | 0.002 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=0$ | 0.0007 | 0.0006 | 0.0008 | 0.953 | 0.962 | 0.968 | 0.002 | 0.002 | 0.002 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{r} 2=0$ | 0.0006 | 0.001 | 0.0005 | 0.965 | 0.977 | 1 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0064 | -0.0065 | -0.0064 | 0.915 | 0.91 | 0.914 | 0.014 | 0.014 | 0.014 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0019 | 0.0019 | 0.0019 | 0.914 | 0.913 | 0.914 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0028 | -0.0028 | -0.0027 | 0.912 | 0.909 | 0.907 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~$ т $2=.1$ | 0.0034 | 0.0037 | 0.0034 | 0.934 | 0.922 | 0.934 | 0.01 | 0.01 | 0.01 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0062 | 0.0059 | 0.0061 | 0.923 | 0.919 | 0.923 | 0.052 | 0.053 | 0.052 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0005 | -0.0005 | -0.0005 | 0.926 | 0.926 | 0.926 | 0.051 | 0.051 | 0.051 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | -0.0077 | -0.0077 | -0.0077 | 0.918 | 0.917 | 0.915 | 0.053 | 0.053 | 0.053 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0142 | 0.0142 | 0.0142 | 0.918 | 0.917 | 0.917 | 0.05 | 0.05 | 0.05 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | 0.0011 | 0.0018 | 0.0013 | 0.959 | 0.935 | 0.926 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0008 | 0.0008 | 0.0007 | 0.966 | 0.958 | 0.952 | 0.002 | 0.002 | 0.002 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | -0.0023 | -0.0023 | -0.0022 | 0.956 | 0.963 | 0.974 | 0.001 | 0.001 | 0.001 |
| TX = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0003 | -0.0006 | -0.0004 | 0.955 | 0.963 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | -0.0054 | -0.0054 | -0.0054 | 0.946 | 0.936 | 0.943 | 0.011 | 0.011 | 0.011 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0013 | 0.0013 | 0.0013 | 0.921 | 0.92 | 0.923 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | -0.0018 | -0.0018 | -0.0018 | 0.907 | 0.909 | 0.908 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{r} 2=.1$ | -0.0009 | -0.0007 | -0.0009 | 0.937 | 0.938 | 0.938 | 0.01 | 0.01 | 0.01 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0016 | 0.0016 | 0.0016 | 0.924 | 0.918 | 0.922 | 0.055 | 0.055 | 0.055 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0007 | 0.0007 | 0.0007 | 0.92 | 0.922 | 0.921 | 0.05 | 0.05 | 0.05 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0114 | 0.0114 | 0.0114 | 0.916 | 0.915 | 0.916 | 0.053 | 0.053 | 0.053 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | -0.0012 | -0.0014 | -0.0013 | 0.92 | 0.914 | 0.919 | 0.052 | 0.052 | 0.052 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \tau 2=0$ | 0.0078 | 0.0095 | 0.008 | 0.956 | 0.932 | 0.928 | 0.021 | 0.021 | 0.02 |
| Tx = .5; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \tau 2=0$ | 0.0025 | 0.0031 | 0.0035 | 0.955 | 0.952 | 0.946 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0038 | -0.0036 | -0.0041 | 0.956 | 0.961 | 0.965 | 0.009 | 0.009 | 0.009 |
| $T x=.5 ; \rho=0.81 ; S S=20 ; S S R=1 ; \tau 2=0$ | -0.0004 | -0.0019 | -0.0016 | 0.96 | 0.972 | 0.999 | 0.004 | 0.005 | 0.004 |
| $\mathrm{TX}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0059 | 0.0066 | 0.0061 | 0.937 | 0.928 | 0.926 | 0.03 | 0.03 | 0.03 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{r} 2=.1$ | 0.0033 | 0.0035 | 0.0032 | 0.931 | 0.93 | 0.931 | 0.022 | 0.022 | 0.022 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{r} 2=.1$ | -0.003 | -0.0034 | -0.0029 | 0.929 | 0.928 | 0.931 | 0.018 | 0.018 | 0.018 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0026 | 0.002 | 0.0028 | 0.921 | 0.925 | 0.945 | 0.013 | 0.014 | 0.014 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0061 | -0.0062 | -0.007 | 0.913 | 0.913 | 0.912 | 0.073 | 0.073 | 0.072 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0144 | 0.014 | 0.0142 | 0.906 | 0.907 | 0.91 | 0.07 | 0.069 | 0.069 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{r} 2=.5$ | -0.0081 | -0.0081 | -0.0079 | 0.928 | 0.924 | 0.925 | 0.057 | 0.057 | 0.056 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0038 | -0.0031 | -0.0036 | 0.917 | 0.92 | 0.918 | 0.055 | 0.055 | 0.055 |
| Tx = .5; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ t 2=0$ | 0.0006 | 0.0012 | 0.0006 | 0.963 | 0.94 | 0.939 | 0.015 | 0.015 | 0.015 |
| Tx = .5; $\rho=0.40 ; S S=20 ; S S R=2 ; ~ ז 2=0$ | 0.0048 | 0.005 | 0.0052 | 0.962 | 0.96 | 0.957 | 0.009 | 0.009 | 0.009 |
| $T x=.5 ; \rho=0.59 ; S S=20 ; S S R=2 ; \tau 2=0$ | -0.0006 | -0.0001 | 0.0002 | 0.955 | 0.956 | 0.961 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0016 | 0.0005 | 0.0016 | 0.96 | 0.962 | 0.999 | 0.003 | 0.003 | 0.003 |
| $\mathrm{TX}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0021 | 0.0023 | 0.0033 | 0.937 | 0.93 | 0.932 | 0.025 | 0.025 | 0.025 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = . $; ~ \rho=0.40 ; ~ S S=20 ; ~ S S R=2 ; ~ ז 2=.1$ | -0.0032 | -0.0037 | -0.0031 | 0.923 | 0.922 | 0.919 | 0.019 | 0.019 | 0.019 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.1$ | -0.0049 | -0.0046 | -0.0045 | 0.926 | 0.921 | 0.926 | 0.015 | 0.015 | 0.015 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=20 ; ~ S S R=2 ; ~ ז 2=.1$ | -0.0027 | -0.0026 | -0.0032 | 0.903 | 0.911 | 0.916 | 0.014 | 0.014 | 0.014 |
| Tx = . $; ~ \rho=0.00 ; ~ S S=20 ; S S R=2 ; ~ \tau 2=.5$ | 0.0157 | 0.0161 | 0.0161 | 0.904 | 0.896 | 0.908 | 0.07 | 0.071 | 0.07 |
| Tx = . $5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.5$ | 0.008 | 0.0079 | 0.0079 | 0.921 | 0.927 | 0.927 | 0.056 | 0.056 | 0.056 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.5$ | -0.0134 | -0.0133 | -0.0135 | 0.904 | 0.906 | 0.91 | 0.06 | 0.06 | 0.06 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ \tau 2=.5$ | 0.0086 | 0.0094 | 0.0085 | 0.922 | 0.922 | 0.922 | 0.051 | 0.051 | 0.051 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{t} 2=0$ | -0.0066 | -0.0072 | -0.0068 | 0.958 | 0.927 | 0.926 | 0.008 | 0.009 | 0.008 |
| $T x=.5 ; \rho=0.40 ; S S=50 ; S S R=1 ; \tau 2=0$ | 0.0013 | 0.0015 | 0.0014 | 0.957 | 0.949 | 0.943 | 0.005 | 0.005 | 0.005 |
| $T x=.5 ; \rho=0.59 ; S S=50 ; S S R=1 ; \tau 2=0$ | -0.001 | -0.0009 | -0.0012 | 0.969 | 0.971 | 0.975 | 0.003 | 0.003 | 0.003 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \tau 2=0$ | -0.0004 | -0.0007 | -0.0006 | 0.956 | 0.973 | 0.999 | 0.002 | 0.002 | 0.002 |
| Tx = . $; ~ \rho=0.00 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | -0.0051 | -0.0046 | -0.0052 | 0.912 | 0.917 | 0.903 | 0.018 | 0.018 | 0.018 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.1$ | -0.0028 | -0.0028 | -0.0028 | 0.925 | 0.927 | 0.925 | 0.015 | 0.015 | 0.015 |
| Tx = . $; ~ \rho=0.59 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | 0.003 | 0.0029 | 0.0028 | 0.918 | 0.92 | 0.919 | 0.013 | 0.013 | 0.013 |
| TX = . $; ~ \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ \tau 2=.1$ | 0.0082 | 0.0082 | 0.0085 | 0.925 | 0.926 | 0.927 | 0.011 | 0.012 | 0.011 |
| Tx = . $5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.5$ | 0.0041 | 0.0038 | 0.0039 | 0.915 | 0.922 | 0.915 | 0.054 | 0.055 | 0.054 |
| Tx = . $; \rho=0.40 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.5$ | -0.0091 | -0.0092 | -0.009 | 0.919 | 0.922 | 0.922 | 0.054 | 0.054 | 0.054 |
| Tx = . $; ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0.0012 | 0.0012 | 0.0012 | 0.923 | 0.923 | 0.925 | 0.054 | 0.054 | 0.054 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ \tau 2=.5$ | 0.0112 | 0.0115 | 0.0112 | 0.908 | 0.909 | 0.911 | 0.053 | 0.052 | 0.053 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.001 | -0.0004 | -0.0006 | 0.957 | 0.939 | 0.936 | 0.006 | 0.006 | 0.006 |
| $T x=.5 ; \rho=0.40 ; S S=50 ; S S R=2 ; \tau 2=0$ | 0.0013 | 0.0016 | 0.0014 | 0.962 | 0.96 | 0.954 | 0.003 | 0.003 | 0.003 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | -0.0004 | -0.0003 | -0.0006 | 0.956 | 0.961 | 0.969 | 0.003 | 0.003 | 0.003 |
| TX = .5; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0003 | 0.0009 | 0.0005 | 0.954 | 0.973 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = . $; ~ \rho=0.00 ; ~ S S=50 ; ~ S S R=2 ; ~ ז 2=.1$ | 0.0014 | 0.002 | 0.0013 | 0.918 | 0.913 | 0.919 | 0.016 | 0.016 | 0.016 |
| Tx = . $; ~ \rho=0.40 ; ~ S S=50 ; ~ S S R=2 ; ~ T 2=.1$ | 0.0042 | 0.0041 | 0.0042 | 0.922 | 0.922 | 0.918 | 0.014 | 0.014 | 0.014 |
| TX = . $; ~ \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | 0.0017 | 0.0017 | 0.0018 | 0.925 | 0.923 | 0.923 | 0.012 | 0.012 | 0.012 |
| TX = . $; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0 | -0.0001 | -0.0001 | 0.913 | 0.915 | 0.911 | 0.012 | 0.012 | 0.012 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | -0.0016 | -0.0017 | -0.0014 | 0.93 | 0.925 | 0.93 | 0.052 | 0.052 | 0.052 |
| TX $=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | -0.0003 | -0.0005 | -0.0005 | 0.922 | 0.921 | 0.922 | 0.055 | 0.055 | 0.055 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ ז 2=.5$ | 0.011 | 0.0109 | 0.0109 | 0.915 | 0.917 | 0.917 | 0.051 | 0.051 | 0.051 |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0073 | 0.0072 | 0.0072 | 0.929 | 0.926 | 0.927 | 0.048 | 0.048 | 0.048 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0001 | -0.0007 | -0.0001 | 0.95 | 0.925 | 0.924 | 0.004 | 0.004 | 0.004 |
| TX = . $; ~ \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0011 | -0.0012 | -0.0012 | 0.961 | 0.957 | 0.951 | 0.002 | 0.002 | 0.002 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0009 | -0.001 | -0.0009 | 0.963 | 0.968 | 0.974 | 0.002 | 0.002 | 0.002 |
| Tx = . $; \rho=0.81 ; ~ \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0012 | 0.0019 | 0.0011 | 0.963 | 0.976 | 1 | 0.001 | 0.001 | 0.001 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | -0.0011 | -0.0015 | -0.0011 | 0.93 | 0.926 | 0.926 | 0.014 | 0.014 | 0.014 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | 0.0013 | 0.0012 | 0.0013 | 0.918 | 0.917 | 0.92 | 0.012 | 0.012 | 0.012 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0022 | 0.0022 | 0.0022 | 0.923 | 0.923 | 0.925 | 0.011 | 0.011 | 0.011 |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0038 | -0.0038 | -0.0039 | 0.904 | 0.911 | 0.91 | 0.011 | 0.011 | 0.011 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0077 | 0.0078 | 0.0077 | 0.916 | 0.918 | 0.917 | 0.055 | 0.055 | 0.055 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0072 | 0.0072 | 0.0072 | 0.913 | 0.914 | 0.913 | 0.052 | 0.052 | 0.052 |
| TX = . $; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0046 | -0.0046 | -0.0046 | 0.909 | 0.909 | 0.909 | 0.054 | 0.054 | 0.054 |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0.0082 | 0.0081 | 0.0081 | 0.912 | 0.906 | 0.913 | 0.052 | 0.052 | 0.052 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | 0.003 | 0.0028 | 0.003 | 0.957 | 0.927 | 0.929 | 0.003 | 0.003 | 0.003 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | -0.0023 | -0.0023 | -0.0021 | 0.955 | 0.946 | 0.945 | 0.002 | 0.002 | 0.002 |
| TX = .5; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0016 | -0.0015 | -0.0017 | 0.963 | 0.967 | 0.976 | 0.001 | 0.001 | 0.001 |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | 0.0001 | 0.0004 | 0 | 0.966 | 0.975 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0066 | 0.0064 | 0.0065 | 0.916 | 0.91 | 0.918 | 0.013 | 0.013 | 0.013 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | 0.0018 | 0.0018 | 0.0018 | 0.932 | 0.932 | 0.932 | 0.011 | 0.011 | 0.011 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ;$ т2 = . 1 | -0.0035 | -0.0035 | -0.0034 | 0.92 | 0.919 | 0.919 | 0.011 | 0.011 | 0.011 |
| Tx = . $; ~ \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0024 | 0.0026 | 0.0023 | 0.914 | 0.907 | 0.912 | 0.01 | 0.01 | 0.01 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | -0.0082 | -0.008 | -0.0082 | 0.913 | 0.911 | 0.909 | 0.054 | 0.054 | 0.054 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | -0.0081 | -0.008 | -0.008 | 0.922 | 0.923 | 0.923 | 0.051 | 0.051 | 0.051 |
| TX = . $; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~$ т2 = . 5 | -0.0098 | -0.0098 | -0.0098 | 0.909 | 0.911 | 0.909 | 0.052 | 0.052 | 0.052 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~$ т $2=.5$ | 0.006 | 0.0061 | 0.006 | 0.915 | 0.907 | 0.912 | 0.051 | 0.051 | 0.051 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0055 | -0.0064 | -0.0065 | 0.965 | 0.941 | 0.938 | 0.02 | 0.02 | 0.019 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0032 | 0.0033 | 0.0037 | 0.968 | 0.966 | 0.961 | 0.011 | 0.011 | 0.011 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0036 | -0.0033 | -0.0028 | 0.955 | 0.967 | 0.973 | 0.009 | 0.009 | 0.009 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0017 | 0.0004 | 0.0019 | 0.961 | 0.977 | 0.996 | 0.004 | 0.004 | 0.004 |
| TX = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | -0.0043 | -0.0041 | -0.0048 | 0.943 | 0.93 | 0.931 | 0.031 | 0.032 | 0.031 |
| Tx = 1; $\rho=0.40 ; S S=20 ; S S R=1 ; ~ \tau 2=.1$ | 0.0065 | 0.0067 | 0.0061 | 0.923 | 0.927 | 0.927 | 0.022 | 0.022 | 0.022 |
| TX = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0016 | -0.0017 | -0.0023 | 0.93 | 0.927 | 0.932 | 0.018 | 0.019 | 0.019 |
| Tx = 1; $\rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ t 2=.1$ | -0.0032 | -0.0033 | -0.0026 | 0.914 | 0.913 | 0.939 | 0.014 | 0.015 | 0.015 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ t 2=.5$ | 0.0029 | 0.0034 | 0.0028 | 0.932 | 0.928 | 0.936 | 0.065 | 0.065 | 0.065 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0.0158 | 0.0152 | 0.0151 | 0.928 | 0.922 | 0.932 | 0.06 | 0.06 | 0.06 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0.0023 | 0.0029 | 0.0025 | 0.935 | 0.93 | 0.925 | 0.057 | 0.057 | 0.057 |
| Tx = 1; $\rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ \tau 2=.5$ | 0.003 | 0.0037 | 0.0034 | 0.914 | 0.92 | 0.916 | 0.056 | 0.056 | 0.056 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | 0.0023 | 0.0025 | 0.002 | 0.94 | 0.916 | 0.916 | 0.018 | 0.018 | 0.017 |
| $\mathrm{Tx}=1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0013 | -0.0015 | -0.0017 | 0.96 | 0.953 | 0.95 | 0.009 | 0.009 | 0.009 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0038 | -0.0036 | -0.0043 | 0.949 | 0.951 | 0.961 | 0.007 | 0.007 | 0.006 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0012 | -0.0008 | -0.0018 | 0.946 | 0.962 | 0.999 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ \tau 2=.1$ | -0.0114 | -0.0102 | -0.0109 | 0.927 | 0.918 | 0.916 | 0.026 | 0.026 | 0.026 |
| TX = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.1$ | 0.0021 | 0.002 | 0.002 | 0.932 | 0.925 | 0.927 | 0.019 | 0.019 | 0.019 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.1$ | -0.0045 | -0.0043 | -0.0044 | 0.92 | 0.92 | 0.92 | 0.017 | 0.017 | 0.017 |
| Tx = 1; $\rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ t 2=.1$ | -0.0037 | -0.0029 | -0.0034 | 0.901 | 0.887 | 0.916 | 0.014 | 0.015 | 0.015 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ \tau 2=.5$ | -0.0029 | -0.003 | -0.0027 | 0.913 | 0.913 | 0.916 | 0.065 | 0.065 | 0.065 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.5$ | -0.0136 | -0.0134 | -0.0132 | 0.925 | 0.925 | 0.925 | 0.055 | 0.055 | 0.055 |
| $T \mathrm{x}=1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0002 | 0.0001 | 0.0001 | 0.92 | 0.925 | 0.929 | 0.057 | 0.057 | 0.057 |
| $T x=1 ; \rho=0.81 ; ~ S S=20 ; ~ S S R=2 ; ~ \tau 2=.5$ | 0.0006 | -0.0001 | 0.0007 | 0.919 | 0.918 | 0.918 | 0.057 | 0.057 | 0.057 |
| Tx=1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ 72=0$ | 0.0045 | 0.0041 | 0.0045 | 0.963 | 0.93 | 0.931 | 0.008 | 0.008 | 0.008 |
| $\mathrm{T} x=1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=0$ | -0.0017 | -0.0016 | -0.0021 | 0.968 | 0.958 | 0.958 | 0.005 | 0.005 | 0.005 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | -0.0009 | -0.0009 | -0.0009 | 0.957 | 0.962 | 0.971 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0012 | 0.001 | 0.0016 | 0.956 | 0.972 | 0.997 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ \tau 2=.1$ | -0.0025 | -0.0024 | -0.0028 | 0.92 | 0.92 | 0.916 | 0.018 | 0.018 | 0.018 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | -0.0038 | -0.004 | -0.004 | 0.924 | 0.918 | 0.915 | 0.016 | 0.016 | 0.016 |
| Tx = 1; $\rho=0.59 ; S S=50 ; S S R=1 ; ~ \tau 2=.1$ | 0.0003 | 0.0001 | 0.0003 | 0.918 | 0.92 | 0.92 | 0.014 | 0.014 | 0.014 |
| TX = 1; $\rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ \tau 2=.1$ | 0.0033 | 0.0031 | 0.0033 | 0.91 | 0.909 | 0.912 | 0.012 | 0.012 | 0.012 |
| Tx = 1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ \tau 2=.5$ | 0.001 | 0.001 | 0.0011 | 0.918 | 0.915 | 0.917 | 0.062 | 0.062 | 0.062 |
| TX = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | -0.0149 | -0.0149 | -0.0149 | 0.931 | 0.931 | 0.931 | 0.052 | 0.052 | 0.052 |
| Tx = 1; $\rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0029 | 0.0028 | 0.0028 | 0.917 | 0.917 | 0.918 | 0.053 | 0.053 | 0.053 |
| Tx = 1; $\rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ ז 2=.5$ | 0.0106 | 0.0103 | 0.0106 | 0.93 | 0.919 | 0.929 | 0.049 | 0.049 | 0.049 |
| $\mathrm{Tx}=1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0032 | 0.0029 | 0.0034 | 0.965 | 0.946 | 0.933 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ T 2=0$ | -0.0008 | -0.0009 | -0.0006 | 0.959 | 0.958 | 0.952 | 0.003 | 0.003 | 0.003 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ t 2=0$ | -0.0012 | -0.0013 | -0.001 | 0.951 | 0.957 | 0.966 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | -0.0001 | 0 | -0.0003 | 0.957 | 0.97 | 0.997 | 0.001 | 0.001 | 0.001 |
| TX = 1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.1$ | -0.001 | -0.0012 | -0.001 | 0.896 | 0.895 | 0.892 | 0.017 | 0.017 | 0.017 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0018 | 0.0019 | 0.0019 | 0.922 | 0.92 | 0.921 | 0.013 | 0.013 | 0.013 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0011 | 0.0011 | 0.0012 | 0.911 | 0.91 | 0.916 | 0.013 | 0.013 | 0.013 |
| Tx = 1; $\rho=0.81 ; ~ S S=50 ; ~ S S R=2 ; ~ \tau 2=.1$ | -0.001 | -0.0015 | -0.0011 | 0.93 | 0.928 | 0.932 | 0.011 | 0.011 | 0.011 |
| TX = 1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0035 | 0.0037 | 0.0035 | 0.921 | 0.911 | 0.921 | 0.056 | 0.056 | 0.056 |
| $T \mathrm{X}=1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0175 | 0.0174 | 0.0174 | 0.929 | 0.931 | 0.934 | 0.049 | 0.049 | 0.049 |
| Tx = 1; $\rho=0.59 ; S S=50 ; S S R=2 ; ~ ז 2=.5$ | 0.0047 | 0.0047 | 0.0046 | 0.921 | 0.924 | 0.919 | 0.051 | 0.051 | 0.051 |
| $T \mathrm{x}=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0009 | 0.0011 | 0.0009 | 0.914 | 0.91 | 0.916 | 0.052 | 0.052 | 0.052 |
| Tx = 1; $\rho=0.00 ; S S=100 ; S S R=1 ; ~ \tau 2=0$ | 0.0019 | 0.0021 | 0.0022 | 0.953 | 0.922 | 0.922 | 0.004 | 0.004 | 0.004 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0033 | -0.0032 | -0.0033 | 0.956 | 0.949 | 0.949 | 0.003 | 0.003 | 0.003 |
| TX = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0015 | 0.0018 | 0.0017 | 0.969 | 0.971 | 0.977 | 0.002 | 0.002 | 0.002 |
| TX = 1; $\rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0013 | -0.0016 | -0.0012 | 0.97 | 0.966 | 0.999 | 0.001 | 0.001 | 0.001 |
| TX = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.002 | 0.0021 | 0.0021 | 0.923 | 0.92 | 0.923 | 0.014 | 0.014 | 0.014 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | 0.0001 | 0.0001 | 0.0002 | 0.902 | 0.898 | 0.9 | 0.013 | 0.013 | 0.013 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0014 | -0.0015 | -0.0015 | 0.92 | 0.92 | 0.923 | 0.012 | 0.012 | 0.012 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | 0.0038 | 0.0036 | 0.0037 | 0.905 | 0.901 | 0.903 | 0.011 | 0.011 | 0.011 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0066 | 0.0067 | 0.0066 | 0.924 | 0.93 | 0.921 | 0.053 | 0.053 | 0.053 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.5$ | 0.0097 | 0.0097 | 0.0097 | 0.914 | 0.915 | 0.911 | 0.056 | 0.056 | 0.056 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0038 | 0.0038 | 0.0038 | 0.918 | 0.919 | 0.918 | 0.053 | 0.053 | 0.053 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0046 | -0.0046 | -0.0046 | 0.916 | 0.915 | 0.914 | 0.048 | 0.048 | 0.048 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0006 | 0.0002 | 0.0005 | 0.958 | 0.918 | 0.927 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=0$ | 0.0019 | 0.002 | 0.0017 | 0.968 | 0.959 | 0.958 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=0$ | -0.0013 | -0.0016 | -0.0013 | 0.953 | 0.959 | 0.965 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=0$ | 0.0005 | 0.0004 | 0.0003 | 0.962 | 0.972 | 1 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.1$ | -0.0007 | -0.0005 | -0.0006 | 0.921 | 0.921 | 0.922 | 0.013 | 0.013 | 0.013 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0043 | -0.0043 | -0.0044 | 0.912 | 0.913 | 0.917 | 0.011 | 0.011 | 0.011 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.1$ | 0.0009 | 0.0009 | 0.0009 | 0.926 | 0.927 | 0.926 | 0.011 | 0.011 | 0.011 |
| TX = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.1$ | 0.0021 | 0.002 | 0.002 | 0.923 | 0.916 | 0.92 | 0.011 | 0.011 | 0.011 |
| TX = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0027 | -0.0027 | -0.0027 | 0.915 | 0.909 | 0.913 | 0.053 | 0.054 | 0.053 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0045 | 0.0045 | 0.0045 | 0.921 | 0.919 | 0.918 | 0.052 | 0.052 | 0.052 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0004 | 0.0004 | 0.0004 | 0.911 | 0.909 | 0.909 | 0.051 | 0.051 | 0.051 |
| TX = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.5$ | 0.0048 | 0.0047 | 0.0047 | 0.914 | 0.918 | 0.917 | 0.05 | 0.05 | 0.05 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ t 2=0$ | 0.0045 | 0.003 | 0.0041 | 0.948 | 0.928 | 0.921 | 0.026 | 0.026 | 0.025 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ t 2=0$ | 0.0002 | -0.0003 | -0.0003 | 0.954 | 0.949 | 0.947 | 0.015 | 0.015 | 0.015 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0031 | 0.0031 | 0.0035 | 0.959 | 0.968 | 0.97 | 0.011 | 0.011 | 0.01 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | 0.004 | 0.0041 | 0.004 | 0.953 | 0.966 | 0.997 | 0.006 | 0.007 | 0.006 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | -0.0112 | -0.0121 | -0.0114 | 0.94 | 0.927 | 0.917 | 0.034 | 0.034 | 0.034 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.004 | -0.0038 | -0.004 | 0.932 | 0.934 | 0.93 | 0.023 | 0.023 | 0.023 |
| TX $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0072 | -0.0074 | -0.0073 | 0.932 | 0.925 | 0.933 | 0.022 | 0.021 | 0.021 |
| TX = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0013 | -0.0016 | -0.0017 | 0.918 | 0.92 | 0.946 | 0.016 | 0.017 | 0.016 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 0; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.014 | -0.0135 | -0.0136 | 0.917 | 0.909 | 0.912 | 0.076 | 0.077 | 0.076 |
| TX $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0119 | -0.0113 | -0.0117 | 0.924 | 0.922 | 0.923 | 0.066 | 0.066 | 0.066 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0155 | 0.0153 | 0.0149 | 0.917 | 0.916 | 0.913 | 0.064 | 0.064 | 0.064 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0097 | -0.0107 | -0.0099 | 0.922 | 0.92 | 0.915 | 0.054 | 0.054 | 0.054 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0016 | 0.0023 | 0.0018 | 0.964 | 0.947 | 0.935 | 0.017 | 0.017 | 0.017 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ 72=0$ | -0.0021 | -0.0023 | -0.0018 | 0.959 | 0.959 | 0.95 | 0.01 | 0.01 | 0.011 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | 0.0004 | 0.0006 | 0.0009 | 0.954 | 0.959 | 0.966 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ 72=0$ | -0.0035 | -0.0039 | -0.0042 | 0.951 | 0.96 | 0.995 | 0.004 | 0.005 | 0.004 |
| Tx = 0; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0058 | -0.0063 | -0.0067 | 0.935 | 0.927 | 0.926 | 0.026 | 0.027 | 0.026 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0163 | -0.0167 | -0.0163 | 0.937 | 0.934 | 0.933 | 0.021 | 0.021 | 0.021 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.1$ | 0.0015 | 0.0023 | 0.0024 | 0.922 | 0.922 | 0.931 | 0.019 | 0.019 | 0.019 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.1$ | 0.0019 | 0.0015 | 0.0015 | 0.927 | 0.921 | 0.937 | 0.014 | 0.014 | 0.014 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.001 | 0.0003 | 0.0012 | 0.918 | 0.916 | 0.915 | 0.071 | 0.071 | 0.071 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0046 | 0.0047 | 0.005 | 0.911 | 0.913 | 0.913 | 0.059 | 0.059 | 0.059 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.005 | 0.005 | 0.0049 | 0.921 | 0.923 | 0.926 | 0.056 | 0.056 | 0.056 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0013 | 0.0016 | 0.0011 | 0.923 | 0.925 | 0.923 | 0.052 | 0.052 | 0.052 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | 0.0019 | 0.0022 | 0.0015 | 0.957 | 0.932 | 0.919 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0016 | -0.0014 | -0.0016 | 0.958 | 0.954 | 0.945 | 0.006 | 0.006 | 0.006 |
| $\mathrm{Tx}=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=0$ | 0.0002 | 0.0004 | 0.0006 | 0.968 | 0.969 | 0.977 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0009 | -0.0008 | -0.001 | 0.96 | 0.97 | 0.998 | 0.002 | 0.003 | 0.002 |
| Tx = 0; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0045 | -0.0042 | -0.0043 | 0.938 | 0.924 | 0.926 | 0.019 | 0.02 | 0.019 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0034 | -0.0036 | -0.0037 | 0.926 | 0.928 | 0.925 | 0.015 | 0.015 | 0.015 |
| TX = 0; $\rho=0.59 ;$ SS =50; SSR =1; $22=.1$ | -0.0004 | -0.0003 | -0.0004 | 0.931 | 0.931 | 0.932 | 0.013 | 0.013 | 0.013 |
| Tx = 0; $\rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | 0.0012 | 0.002 | 0.0011 | 0.921 | 0.917 | 0.924 | 0.012 | 0.012 | 0.012 |
| Tx = 0; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.013 | -0.0129 | -0.013 | 0.94 | 0.938 | 0.939 | 0.053 | 0.053 | 0.053 |
| TX = 0; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0027 | -0.0028 | -0.0028 | 0.929 | 0.928 | 0.926 | 0.054 | 0.054 | 0.054 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0041 | -0.004 | -0.0041 | 0.928 | 0.928 | 0.928 | 0.049 | 0.049 | 0.049 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 0; $\rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ \tau 2=.5$ | -0.0095 | -0.0095 | -0.0095 | 0.922 | 0.921 | 0.923 | 0.054 | 0.054 | 0.054 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | -0.0011 | -0.0004 | -0.001 | 0.962 | 0.936 | 0.931 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | -0.002 | -0.0019 | -0.0019 | 0.955 | 0.948 | 0.942 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | 0.0002 | 0.0001 | 0.0003 | 0.958 | 0.964 | 0.971 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | -0.0001 | -0.001 | -0.0001 | 0.959 | 0.973 | 0.999 | 0.002 | 0.002 | 0.002 |
| TX = 0; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.1$ | 0.0026 | 0.0027 | 0.0024 | 0.925 | 0.917 | 0.921 | 0.018 | 0.018 | 0.018 |
| Tx = 0; $\rho=0.40 ; S S=50 ; S S R=2 ; ~ \tau 2=.1$ | -0.003 | -0.003 | -0.0028 | 0.915 | 0.913 | 0.913 | 0.016 | 0.016 | 0.016 |
| TX $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0017 | -0.0018 | -0.0017 | 0.921 | 0.917 | 0.917 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ \tau 2=.1$ | -0.0046 | -0.0045 | -0.0047 | 0.929 | 0.92 | 0.933 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.00 ; ~ S S=50 ; S S R=2 ; ~ \tau 2=.5$ | 0.0012 | 0.0009 | 0.0013 | 0.924 | 0.924 | 0.925 | 0.056 | 0.056 | 0.056 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0018 | 0.0018 | 0.0018 | 0.92 | 0.922 | 0.921 | 0.055 | 0.055 | 0.055 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ \tau 2=.5$ | -0.0043 | -0.0044 | -0.0043 | 0.917 | 0.914 | 0.915 | 0.053 | 0.053 | 0.054 |
| TX = 0; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0092 | 0.0093 | 0.0092 | 0.933 | 0.933 | 0.931 | 0.052 | 0.052 | 0.052 |
| Tx = 0; $\rho=0.00 ; S S=100 ; S S R=1 ; ~ t 2=0$ | 0.0014 | 0.0011 | 0.0013 | 0.97 | 0.948 | 0.939 | 0.005 | 0.005 | 0.005 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0011 | 0.0011 | 0.0013 | 0.957 | 0.951 | 0.943 | 0.003 | 0.003 | 0.003 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=0$ | -0.0011 | -0.0013 | -0.0013 | 0.949 | 0.964 | 0.971 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.81 ; ~ S S=100 ; ~ S S R=1 ; ~ \tau 2=0$ | -0.0006 | -0.0002 | -0.0006 | 0.966 | 0.971 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | -0.0024 | -0.0024 | -0.0024 | 0.918 | 0.908 | 0.916 | 0.016 | 0.016 | 0.016 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0006 | 0.0006 | 0.0006 | 0.921 | 0.925 | 0.923 | 0.013 | 0.013 | 0.013 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0031 | -0.0031 | -0.0032 | 0.898 | 0.902 | 0.901 | 0.014 | 0.014 | 0.014 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | 0.0006 | 0.0005 | 0.0007 | 0.921 | 0.925 | 0.923 | 0.011 | 0.011 | 0.011 |
| TX = 0; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0175 | 0.0175 | 0.0175 | 0.912 | 0.911 | 0.913 | 0.055 | 0.055 | 0.055 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.5$ | -0.0017 | -0.0016 | -0.0016 | 0.919 | 0.921 | 0.92 | 0.052 | 0.052 | 0.052 |
| TX = 0; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0008 | -0.0007 | -0.0008 | 0.938 | 0.936 | 0.938 | 0.049 | 0.049 | 0.049 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.5$ | -0.0003 | -0.0002 | -0.0002 | 0.919 | 0.915 | 0.92 | 0.05 | 0.05 | 0.05 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0038 | 0.0036 | 0.0038 | 0.95 | 0.935 | 0.931 | 0.004 | 0.004 | 0.004 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=0$ | -0.0002 | -0.0004 | -0.0001 | 0.963 | 0.953 | 0.95 | 0.002 | 0.002 | 0.002 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 0; $\rho=0.59 ; S S=100 ; S S R=2 ; ~ t 2=0$ | -0.0027 | -0.0028 | -0.0027 | 0.965 | 0.967 | 0.974 | 0.001 | 0.001 | 0.001 |
| Tx = 0; $\rho=0.81 ;$ SS = 100; SSR $=2 ; ~ T 2=0$ | 0.0005 | 0.0007 | 0.0005 | 0.961 | 0.971 | 1 | 0.001 | 0.001 | 0.001 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.1$ | -0.0006 | -0.0008 | -0.0006 | 0.921 | 0.919 | 0.922 | 0.013 | 0.013 | 0.013 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0033 | 0.0034 | 0.0033 | 0.913 | 0.915 | 0.917 | 0.012 | 0.012 | 0.012 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.1$ | -0.0003 | -0.0002 | -0.0002 | 0.906 | 0.904 | 0.904 | 0.012 | 0.012 | 0.012 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0019 | -0.0017 | -0.0019 | 0.921 | 0.917 | 0.924 | 0.01 | 0.01 | 0.01 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0054 | 0.0054 | 0.0054 | 0.92 | 0.922 | 0.921 | 0.053 | 0.053 | 0.053 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.5$ | -0.012 | -0.012 | -0.012 | 0.919 | 0.915 | 0.918 | 0.051 | 0.051 | 0.051 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; \tau 2=.5$ | -0.0015 | -0.0015 | -0.0015 | 0.931 | 0.931 | 0.932 | 0.048 | 0.048 | 0.048 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0025 | 0.0026 | 0.0025 | 0.911 | 0.914 | 0.914 | 0.051 | 0.051 | 0.051 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \tau 2=0$ | 0.0009 | 0.0003 | 0 | 0.953 | 0.915 | 0.918 | 0.028 | 0.029 | 0.027 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0057 | -0.0069 | -0.0062 | 0.948 | 0.938 | 0.939 | 0.017 | 0.017 | 0.017 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0076 | 0.0083 | 0.0085 | 0.945 | 0.951 | 0.961 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0 | 0.0001 | -0.0006 | 0.952 | 0.961 | 0.989 | 0.006 | 0.007 | 0.006 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.1$ | -0.0016 | -0.0009 | -0.0021 | 0.93 | 0.916 | 0.918 | 0.036 | 0.037 | 0.035 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.1$ | 0.0041 | 0.004 | 0.0039 | 0.919 | 0.912 | 0.912 | 0.028 | 0.027 | 0.027 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0051 | 0.0056 | 0.0049 | 0.922 | 0.929 | 0.931 | 0.021 | 0.021 | 0.021 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.1$ | 0.005 | 0.006 | 0.0056 | 0.917 | 0.925 | 0.942 | 0.015 | 0.016 | 0.016 |
| TX = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.012 | 0.0114 | 0.0117 | 0.936 | 0.93 | 0.931 | 0.071 | 0.072 | 0.071 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.5$ | -0.0123 | -0.0128 | -0.0127 | 0.92 | 0.922 | 0.921 | 0.068 | 0.068 | 0.068 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0079 | -0.008 | -0.008 | 0.922 | 0.922 | 0.921 | 0.058 | 0.058 | 0.058 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0053 | 0.0048 | 0.0052 | 0.925 | 0.926 | 0.927 | 0.054 | 0.054 | 0.054 |
| Tx = .1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ t 2=0$ | 0.0023 | 0.002 | 0.0025 | 0.956 | 0.929 | 0.929 | 0.018 | 0.019 | 0.018 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0007 | -0.001 | -0.0011 | 0.959 | 0.955 | 0.957 | 0.011 | 0.01 | 0.01 |
| $T x=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ t 2=0$ | -0.0006 | -0.0007 | -0.001 | 0.952 | 0.962 | 0.973 | 0.008 | 0.008 | 0.008 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.002 | -0.0046 | -0.0025 | 0.963 | 0.979 | 0.998 | 0.004 | 0.004 | 0.004 |
| TX = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0062 | -0.0064 | -0.0058 | 0.942 | 0.935 | 0.933 | 0.026 | 0.026 | 0.026 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0037 | 0.0042 | 0.0042 | 0.919 | 0.919 | 0.918 | 0.022 | 0.022 | 0.021 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0043 | -0.0041 | -0.0041 | 0.929 | 0.933 | 0.931 | 0.017 | 0.017 | 0.017 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0005 | 0.0005 | 0.0006 | 0.919 | 0.92 | 0.926 | 0.014 | 0.014 | 0.014 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0173 | 0.0157 | 0.0174 | 0.919 | 0.919 | 0.922 | 0.068 | 0.068 | 0.068 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.5$ | 0.0029 | 0.0028 | 0.0029 | 0.918 | 0.924 | 0.922 | 0.062 | 0.062 | 0.062 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.5$ | 0.0077 | 0.0077 | 0.0076 | 0.911 | 0.913 | 0.913 | 0.057 | 0.057 | 0.057 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0098 | 0.0088 | 0.0096 | 0.899 | 0.891 | 0.897 | 0.057 | 0.058 | 0.057 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{t} 2=0$ | 0.0021 | 0.0013 | 0.0015 | 0.954 | 0.933 | 0.932 | 0.01 | 0.01 | 0.01 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \tau 2=0$ | 0.0014 | 0.0014 | 0.0013 | 0.96 | 0.953 | 0.947 | 0.006 | 0.006 | 0.006 |
| $T x=.1 ; \rho=0.59 ; S S=50 ; S S R=1 ; \tau 2=0$ | -0.0022 | -0.0023 | -0.0021 | 0.959 | 0.965 | 0.969 | 0.004 | 0.004 | 0.004 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \tau 2=0$ | 0.0007 | 0.0007 | 0.0006 | 0.946 | 0.956 | 0.995 | 0.002 | 0.003 | 0.002 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0008 | 0.0019 | 0.0004 | 0.925 | 0.919 | 0.92 | 0.021 | 0.021 | 0.021 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0008 | -0.0009 | -0.0009 | 0.933 | 0.929 | 0.926 | 0.016 | 0.016 | 0.016 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0015 | -0.0014 | -0.0013 | 0.906 | 0.906 | 0.906 | 0.016 | 0.016 | 0.016 |
| TX = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0071 | 0.0073 | 0.0071 | 0.922 | 0.924 | 0.928 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=.5$ | -0.0066 | -0.0066 | -0.0066 | 0.93 | 0.928 | 0.929 | 0.059 | 0.059 | 0.059 |
| Tx = .1; $\rho=0.40 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.5$ | 0.0075 | 0.0074 | 0.0074 | 0.927 | 0.926 | 0.929 | 0.058 | 0.058 | 0.058 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0.0008 | 0.0009 | 0.0007 | 0.936 | 0.928 | 0.928 | 0.054 | 0.054 | 0.054 |
| Tx = 1; $\rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ \tau 2=.5$ | -0.0002 | 0.0003 | 0 | 0.935 | 0.931 | 0.935 | 0.048 | 0.048 | 0.048 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0043 | 0.0042 | 0.0039 | 0.971 | 0.948 | 0.939 | 0.006 | 0.007 | 0.006 |
| $T x=.1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ ז 2=0$ | -0.0007 | -0.0005 | -0.0004 | 0.956 | 0.947 | 0.942 | 0.004 | 0.004 | 0.004 |
| TX = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0014 | -0.0017 | -0.0016 | 0.959 | 0.959 | 0.979 | 0.003 | 0.003 | 0.003 |
| TX = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0004 | 0.0006 | 0.0005 | 0.957 | 0.972 | 0.996 | 0.002 | 0.002 | 0.002 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0006 | -0.0006 | -0.0006 | 0.916 | 0.915 | 0.917 | 0.018 | 0.018 | 0.018 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0016 | 0.0016 | 0.0015 | 0.916 | 0.914 | 0.912 | 0.015 | 0.015 | 0.015 |
| TX = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0009 | 0.0009 | 0.0008 | 0.914 | 0.916 | 0.914 | 0.013 | 0.013 | 0.013 |
| TX = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0024 | 0.0023 | 0.0025 | 0.913 | 0.91 | 0.914 | 0.012 | 0.012 | 0.012 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | -0.0027 | -0.0028 | -0.0028 | 0.922 | 0.916 | 0.923 | 0.056 | 0.056 | 0.056 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0191 | 0.019 | 0.019 | 0.923 | 0.92 | 0.922 | 0.054 | 0.054 | 0.054 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ ז 2=.5$ | 0.006 | 0.006 | 0.006 | 0.933 | 0.933 | 0.934 | 0.048 | 0.048 | 0.048 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | -0.0099 | -0.0098 | -0.0099 | 0.905 | 0.91 | 0.906 | 0.053 | 0.053 | 0.053 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0029 | -0.0028 | -0.003 | 0.966 | 0.937 | 0.934 | 0.005 | 0.005 | 0.005 |
| TX = . $1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0028 | 0.0028 | 0.0029 | 0.941 | 0.938 | 0.936 | 0.003 | 0.003 | 0.003 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0003 | 0.0003 | 0.0003 | 0.959 | 0.966 | 0.972 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.0001 | -0.0002 | 0.0002 | 0.963 | 0.975 | 0.994 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | -0.0008 | -0.0009 | -0.0006 | 0.915 | 0.91 | 0.909 | 0.015 | 0.016 | 0.015 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | -0.0036 | -0.0034 | -0.0034 | 0.9 | 0.905 | 0.903 | 0.014 | 0.014 | 0.014 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0015 | 0.0016 | 0.0016 | 0.926 | 0.928 | 0.927 | 0.012 | 0.013 | 0.012 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0027 | -0.0028 | -0.0027 | 0.922 | 0.923 | 0.922 | 0.011 | 0.011 | 0.011 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0186 | -0.0186 | -0.0186 | 0.919 | 0.911 | 0.918 | 0.058 | 0.058 | 0.058 |
| $T x=.1 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ \tau 2=.5$ | 0.0005 | 0.0005 | 0.0005 | 0.922 | 0.922 | 0.923 | 0.051 | 0.051 | 0.051 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0004 | 0.0003 | 0.0004 | 0.907 | 0.911 | 0.91 | 0.052 | 0.052 | 0.052 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | -0.0012 | -0.0012 | -0.0012 | 0.909 | 0.909 | 0.91 | 0.05 | 0.05 | 0.05 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{r} 2=0$ | 0.0005 | 0.0004 | 0.0006 | 0.963 | 0.937 | 0.931 | 0.004 | 0.004 | 0.003 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | 0.0008 | 0.0009 | 0.0007 | 0.97 | 0.965 | 0.961 | 0.002 | 0.002 | 0.002 |
| TX = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0015 | -0.0016 | -0.0015 | 0.961 | 0.966 | 0.974 | 0.002 | 0.002 | 0.002 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | 0.0005 | 0.0007 | 0.0006 | 0.956 | 0.98 | 0.996 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | -0.0038 | -0.0044 | -0.0037 | 0.922 | 0.921 | 0.923 | 0.013 | 0.013 | 0.014 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | -0.006 | -0.006 | -0.006 | 0.929 | 0.928 | 0.929 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ;$ т2 = . 1 | 0.0027 | 0.0027 | 0.0027 | 0.914 | 0.914 | 0.916 | 0.012 | 0.012 | 0.012 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~$ т2 = . 1 | -0.0006 | -0.0004 | -0.0006 | 0.934 | 0.935 | 0.934 | 0.01 | 0.01 | 0.01 |
| $T x=.1 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ \tau 2=.5$ | 0.0046 | 0.0044 | 0.0046 | 0.927 | 0.925 | 0.926 | 0.052 | 0.052 | 0.052 |
| $\mathrm{T} x=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0023 | -0.0023 | -0.0023 | 0.916 | 0.913 | 0.914 | 0.052 | 0.052 | 0.052 |
| TX = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.001 | 0.001 | 0.001 | 0.923 | 0.924 | 0.925 | 0.052 | 0.052 | 0.052 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~$ т $2=.5$ | -0.0104 | -0.0104 | -0.0104 | 0.92 | 0.913 | 0.92 | 0.05 | 0.05 | 0.05 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0026 | 0.0033 | 0.0028 | 0.945 | 0.922 | 0.922 | 0.027 | 0.028 | 0.026 |
| $T x=.5 ; \rho=0.40 ; S S=20 ; S S R=1 ; \tau 2=0$ | 0.0061 | 0.0054 | 0.0059 | 0.951 | 0.948 | 0.945 | 0.016 | 0.016 | 0.016 |
| $T x=.5 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ t 2=0$ | 0.0077 | 0.0076 | 0.0084 | 0.954 | 0.958 | 0.971 | 0.011 | 0.011 | 0.011 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \tau 2=0$ | -0.0013 | -0.0012 | -0.0018 | 0.961 | 0.969 | 0.998 | 0.005 | 0.006 | 0.005 |
| $\mathrm{TX}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0088 | 0.0085 | 0.0076 | 0.933 | 0.914 | 0.912 | 0.037 | 0.038 | 0.036 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.006 | 0.0057 | 0.0055 | 0.923 | 0.924 | 0.919 | 0.025 | 0.025 | 0.025 |
| $\mathrm{TX}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0053 | -0.0051 | -0.0054 | 0.906 | 0.906 | 0.909 | 0.022 | 0.023 | 0.023 |
| $T x=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{r} 2=.1$ | 0 | -0.0004 | -0.0004 | 0.922 | 0.922 | 0.948 | 0.015 | 0.016 | 0.015 |
| $T x=.5 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ ז 2=.5$ | 0.0021 | 0.0016 | 0.0018 | 0.93 | 0.93 | 0.927 | 0.073 | 0.074 | 0.073 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0013 | -0.0009 | -0.0011 | 0.921 | 0.925 | 0.922 | 0.065 | 0.065 | 0.065 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0097 | -0.0089 | -0.009 | 0.898 | 0.899 | 0.903 | 0.065 | 0.065 | 0.065 |
| TX $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0029 | 0.0027 | 0.0029 | 0.914 | 0.906 | 0.909 | 0.06 | 0.061 | 0.061 |
| $T x=.5 ; \rho=0.00 ; S S=20 ; S S R=2 ; \tau 2=0$ | 0.006 | 0.0064 | 0.0055 | 0.954 | 0.941 | 0.927 | 0.017 | 0.017 | 0.017 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0029 | 0.0022 | 0.0021 | 0.943 | 0.943 | 0.941 | 0.012 | 0.011 | 0.011 |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=0$ | -0.0037 | -0.0037 | -0.0039 | 0.964 | 0.971 | 0.976 | 0.008 | 0.008 | 0.007 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=0$ | -0.0014 | -0.001 | -0.001 | 0.956 | 0.978 | 0.995 | 0.004 | 0.004 | 0.004 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | -0.0064 | -0.0074 | -0.0072 | 0.928 | 0.924 | 0.922 | 0.029 | 0.029 | 0.028 |
| $\mathrm{TX}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | 0.0046 | 0.0045 | 0.0048 | 0.913 | 0.913 | 0.914 | 0.022 | 0.022 | 0.022 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | -0.003 | -0.0031 | -0.003 | 0.929 | 0.928 | 0.932 | 0.017 | 0.017 | 0.017 |
| $T \mathrm{x}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{r} 2=.1$ | 0.0008 | 0.0002 | 0.0015 | 0.93 | 0.92 | 0.939 | 0.013 | 0.013 | 0.013 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0009 | 0.0001 | 0.0006 | 0.921 | 0.921 | 0.918 | 0.069 | 0.069 | 0.068 |
| $\mathrm{TX}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0099 | 0.0098 | 0.0097 | 0.923 | 0.92 | 0.922 | 0.063 | 0.063 | 0.063 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ ז 2=.5$ | -0.0016 | -0.0017 | -0.0016 | 0.925 | 0.919 | 0.921 | 0.055 | 0.055 | 0.055 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0084 | 0.0084 | 0.0081 | 0.91 | 0.913 | 0.91 | 0.056 | 0.056 | 0.056 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0013 | -0.002 | -0.0013 | 0.955 | 0.927 | 0.913 | 0.01 | 0.011 | 0.01 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{t} 2=0$ | 0.0036 | 0.0036 | 0.0038 | 0.963 | 0.959 | 0.958 | 0.006 | 0.006 | 0.006 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .5; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \tau 2=0$ | 0.0002 | 0.0004 | 0.0003 | 0.95 | 0.955 | 0.963 | 0.005 | 0.005 | 0.005 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0001 | 0.0004 | 0.0002 | 0.967 | 0.975 | 0.999 | 0.002 | 0.003 | 0.002 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0004 | 0.0004 | 0.0005 | 0.926 | 0.924 | 0.92 | 0.019 | 0.019 | 0.019 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ 72=.1$ | -0.0013 | -0.0014 | -0.0015 | 0.927 | 0.924 | 0.925 | 0.016 | 0.016 | 0.016 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0074 | 0.0072 | 0.0071 | 0.936 | 0.934 | 0.935 | 0.014 | 0.014 | 0.014 |
| TX $=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0025 | 0.0031 | 0.0027 | 0.913 | 0.912 | 0.913 | 0.013 | 0.013 | 0.013 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0034 | 0.0034 | 0.0034 | 0.925 | 0.929 | 0.927 | 0.056 | 0.056 | 0.057 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0033 | -0.0032 | -0.0033 | 0.918 | 0.916 | 0.916 | 0.057 | 0.057 | 0.057 |
| $T x=.5 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ ז 2=.5$ | -0.0074 | -0.0074 | -0.0074 | 0.939 | 0.94 | 0.937 | 0.051 | 0.051 | 0.051 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{r} 2=.5$ | 0.017 | 0.0169 | 0.0169 | 0.932 | 0.938 | 0.93 | 0.049 | 0.049 | 0.049 |
| $T x=.5 ; \rho=0.00 ; S S=50 ; S S R=2 ; \tau 2=0$ | 0.0006 | -0.0001 | 0.0008 | 0.961 | 0.933 | 0.928 | 0.007 | 0.007 | 0.007 |
| $T x=.5 ; \rho=0.40 ; S S=50 ; S S R=2 ; \tau 2=0$ | -0.0002 | 0 | -0.0002 | 0.951 | 0.945 | 0.941 | 0.004 | 0.004 | 0.004 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0007 | -0.0009 | -0.0007 | 0.961 | 0.968 | 0.969 | 0.003 | 0.003 | 0.003 |
| $T x=.5 ; \rho=0.81 ; S S=50 ; S S R=2 ; \tau 2=0$ | -0.0005 | -0.0005 | -0.0004 | 0.967 | 0.982 | 1 | 0.001 | 0.002 | 0.001 |
| $\mathrm{TX}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | -0.0064 | -0.0063 | -0.0064 | 0.932 | 0.931 | 0.927 | 0.016 | 0.017 | 0.016 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ ז 2=.1$ | -0.0006 | -0.0006 | -0.0007 | 0.91 | 0.91 | 0.909 | 0.015 | 0.015 | 0.015 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ ז 2=.1$ | -0.0044 | -0.0044 | -0.0045 | 0.926 | 0.927 | 0.927 | 0.013 | 0.013 | 0.013 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0009 | 0.0007 | 0.0007 | 0.908 | 0.905 | 0.908 | 0.012 | 0.012 | 0.012 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | 0.0004 | 0.0006 | 0.0005 | 0.911 | 0.914 | 0.912 | 0.056 | 0.056 | 0.056 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.5$ | -0.0009 | -0.0009 | -0.001 | 0.923 | 0.926 | 0.925 | 0.053 | 0.053 | 0.053 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{r} 2=.5$ | 0.0039 | 0.004 | 0.004 | 0.929 | 0.928 | 0.928 | 0.05 | 0.05 | 0.05 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | 0.0074 | 0.0072 | 0.0073 | 0.935 | 0.934 | 0.938 | 0.05 | 0.05 | 0.05 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | 0.001 | 0.0013 | 0.0011 | 0.955 | 0.93 | 0.926 | 0.005 | 0.005 | 0.005 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{r} 2=0$ | -0.0019 | -0.0019 | -0.002 | 0.957 | 0.949 | 0.939 | 0.003 | 0.003 | 0.003 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0017 | 0.0015 | 0.0016 | 0.964 | 0.97 | 0.974 | 0.002 | 0.002 | 0.002 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0016 | -0.0016 | -0.0017 | 0.962 | 0.973 | 0.997 | 0.001 | 0.001 | 0.001 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | -0.0006 | -0.0004 | -0.0005 | 0.912 | 0.908 | 0.912 | 0.016 | 0.016 | 0.016 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | -0.0038 | -0.0036 | -0.0035 | 0.888 | 0.889 | 0.89 | 0.014 | 0.014 | 0.014 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0009 | 0.0008 | 0.0008 | 0.913 | 0.914 | 0.91 | 0.013 | 0.013 | 0.013 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | -0.0003 | -0.0005 | -0.0004 | 0.921 | 0.918 | 0.921 | 0.011 | 0.011 | 0.011 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0078 | -0.0078 | -0.0078 | 0.906 | 0.907 | 0.906 | 0.057 | 0.057 | 0.057 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0.0004 | 0.0003 | 0.0003 | 0.919 | 0.922 | 0.921 | 0.054 | 0.054 | 0.054 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0055 | 0.0055 | 0.0055 | 0.928 | 0.929 | 0.929 | 0.052 | 0.052 | 0.052 |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0011 | -0.0013 | -0.0012 | 0.924 | 0.923 | 0.924 | 0.051 | 0.051 | 0.051 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | -0.0027 | -0.0034 | -0.003 | 0.953 | 0.929 | 0.931 | 0.004 | 0.004 | 0.004 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; S S R=2 ; ~ 22=0$ | 0.0042 | 0.004 | 0.0041 | 0.958 | 0.956 | 0.953 | 0.002 | 0.002 | 0.002 |
| Tx = . $; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=0$ | -0.0013 | -0.0014 | -0.0013 | 0.969 | 0.97 | 0.973 | 0.001 | 0.001 | 0.001 |
| Tx = . $; ~ \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0 | 0 | 0 | 0.952 | 0.973 | 0.994 | 0.001 | 0.001 | 0.001 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~$ т $2=.1$ | -0.0055 | -0.0051 | -0.0056 | 0.932 | 0.93 | 0.931 | 0.013 | 0.013 | 0.013 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | 0.0038 | 0.0039 | 0.0038 | 0.923 | 0.925 | 0.928 | 0.011 | 0.011 | 0.011 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0063 | -0.0062 | -0.0063 | 0.922 | 0.925 | 0.918 | 0.012 | 0.012 | 0.012 |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | 0.0017 | 0.002 | 0.0018 | 0.905 | 0.912 | 0.904 | 0.012 | 0.012 | 0.012 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0051 | 0.0051 | 0.0051 | 0.925 | 0.925 | 0.926 | 0.051 | 0.051 | 0.051 |
| Tx = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | -0.0008 | -0.0008 | -0.0008 | 0.92 | 0.922 | 0.921 | 0.048 | 0.048 | 0.048 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | -0.001 | -0.001 | -0.001 | 0.915 | 0.916 | 0.914 | 0.053 | 0.053 | 0.053 |
| Tx = . $; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0024 | 0.0024 | 0.0024 | 0.911 | 0.911 | 0.912 | 0.05 | 0.05 | 0.05 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ T 2=0$ | 0.0045 | 0.0047 | 0.0041 | 0.953 | 0.917 | 0.924 | 0.025 | 0.026 | 0.025 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=0$ | 0.0046 | 0.0035 | 0.0031 | 0.955 | 0.951 | 0.947 | 0.016 | 0.015 | 0.015 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0008 | -0.0011 | -0.0003 | 0.959 | 0.962 | 0.968 | 0.011 | 0.011 | 0.011 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0017 | -0.0021 | -0.0019 | 0.947 | 0.961 | 0.993 | 0.006 | 0.007 | 0.006 |
| Tx = 1; $\rho=0.00 ; ~ S S=20 ; S S R=1 ; ~ t 2=.1$ | 0.0043 | 0.0036 | 0.004 | 0.933 | 0.923 | 0.916 | 0.034 | 0.035 | 0.034 |
| Tx = 1; $\rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0008 | 0.0005 | 0.0001 | 0.931 | 0.923 | 0.924 | 0.027 | 0.026 | 0.026 |
| TX = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0056 | 0.0055 | 0.006 | 0.92 | 0.921 | 0.932 | 0.022 | 0.021 | 0.021 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0022 | 0.0032 | 0.0027 | 0.911 | 0.913 | 0.941 | 0.015 | 0.016 | 0.015 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0005 | -0.0017 | 0.0001 | 0.932 | 0.928 | 0.928 | 0.072 | 0.072 | 0.071 |
| TX = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0128 | 0.0124 | 0.0122 | 0.917 | 0.916 | 0.921 | 0.064 | 0.064 | 0.064 |
| Tx = 1; $\rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0109 | 0.0108 | 0.01 | 0.911 | 0.904 | 0.9 | 0.063 | 0.062 | 0.063 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.007 | 0.0063 | 0.0068 | 0.893 | 0.895 | 0.896 | 0.063 | 0.063 | 0.063 |
| $\mathrm{Tx}=1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.002 | 0.0023 | 0.002 | 0.96 | 0.934 | 0.93 | 0.018 | 0.018 | 0.017 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; ~ 72=0$ | 0.0023 | 0.0024 | 0.0025 | 0.959 | 0.954 | 0.952 | 0.01 | 0.01 | 0.01 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T}^{2}=0$ | -0.0009 | -0.001 | -0.0008 | 0.948 | 0.957 | 0.961 | 0.008 | 0.008 | 0.008 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0016 | -0.0011 | -0.0013 | 0.955 | 0.97 | 0.999 | 0.004 | 0.004 | 0.004 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0047 | 0.0022 | 0.0038 | 0.924 | 0.919 | 0.916 | 0.03 | 0.03 | 0.029 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0029 | -0.0029 | -0.0029 | 0.922 | 0.923 | 0.918 | 0.02 | 0.02 | 0.02 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0005 | 0.0005 | 0.0002 | 0.926 | 0.929 | 0.936 | 0.018 | 0.018 | 0.018 |
| Tx = 1; $\rho=0.81 ; ~ S S=20 ; ~ S S R=2 ; ~ T 2=.1$ | 0.0014 | 0.0018 | 0.0007 | 0.929 | 0.92 | 0.942 | 0.013 | 0.014 | 0.013 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0053 | -0.0046 | -0.0054 | 0.915 | 0.911 | 0.913 | 0.071 | 0.071 | 0.071 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.003 | 0.003 | 0.0027 | 0.921 | 0.922 | 0.919 | 0.057 | 0.057 | 0.057 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0008 | -0.0003 | -0.0002 | 0.918 | 0.92 | 0.919 | 0.059 | 0.059 | 0.059 |
| TX = 1; $\rho=0.81 ; ~ S S=20 ; ~ S S R=2 ; ~ T 2=.5$ | -0.004 | -0.0045 | -0.0043 | 0.905 | 0.903 | 0.904 | 0.057 | 0.058 | 0.058 |
| $\mathrm{Tx}=1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | 0.0012 | 0.0011 | 0.0018 | 0.951 | 0.926 | 0.925 | 0.011 | 0.011 | 0.011 |
| $\mathrm{Tx}=1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0008 | -0.0006 | -0.0007 | 0.956 | 0.948 | 0.952 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{t} 2=0$ | -0.0017 | -0.0018 | -0.0021 | 0.938 | 0.946 | 0.958 | 0.005 | 0.005 | 0.005 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=0$ | 0.0025 | 0.0026 | 0.0027 | 0.952 | 0.966 | 0.999 | 0.002 | 0.003 | 0.002 |
| Tx = 1; $\rho=0.00 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | -0.0023 | -0.0025 | -0.0022 | 0.935 | 0.924 | 0.927 | 0.02 | 0.02 | 0.019 |
| TX = 1; $\rho=0.40 ;$ SS =50; SSR =1; 2 = $=1$ | 0.0038 | 0.0037 | 0.004 | 0.919 | 0.921 | 0.923 | 0.015 | 0.015 | 0.015 |
| TX = 1; $\rho=0.59 ;$ SS =50; SSR =1; 2 = $=1$ | -0.0003 | 0 | -0.0002 | 0.934 | 0.939 | 0.939 | 0.013 | 0.013 | 0.013 |
| Tx = 1; $\rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | -0.0006 | -0.001 | -0.0006 | 0.911 | 0.903 | 0.915 | 0.013 | 0.013 | 0.013 |
| TX = 1; $\rho=0.00 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=.5$ | 0.0028 | 0.0026 | 0.0028 | 0.912 | 0.914 | 0.914 | 0.063 | 0.062 | 0.062 |
| TX = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0047 | -0.0045 | -0.0047 | 0.927 | 0.929 | 0.927 | 0.056 | 0.056 | 0.056 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | -0.0005 | -0.0006 | -0.0005 | 0.916 | 0.915 | 0.914 | 0.055 | 0.055 | 0.055 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | -0.0041 | -0.0045 | -0.0041 | 0.922 | 0.921 | 0.916 | 0.054 | 0.054 | 0.054 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=0$ | 0.0006 | 0 | 0.0004 | 0.958 | 0.925 | 0.925 | 0.008 | 0.008 | 0.008 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | 0.0005 | 0.0006 | 0.0003 | 0.95 | 0.945 | 0.945 | 0.004 | 0.005 | 0.004 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=0$ | 0 | 0.0001 | 0 | 0.94 | 0.957 | 0.958 | 0.003 | 0.003 | 0.003 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0002 | -0.0001 | 0 | 0.954 | 0.971 | 1 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0006 | 0.001 | 0.0005 | 0.919 | 0.914 | 0.92 | 0.017 | 0.018 | 0.017 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0012 | 0.001 | 0.001 | 0.893 | 0.897 | 0.898 | 0.015 | 0.015 | 0.015 |
| TX $=1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \mathrm{~T} 2=.1$ | 0.0015 | 0.0015 | 0.0016 | 0.921 | 0.925 | 0.92 | 0.013 | 0.013 | 0.013 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | -0.0032 | -0.0031 | -0.0031 | 0.926 | 0.924 | 0.926 | 0.011 | 0.011 | 0.011 |
| Tx = 1; $\rho=0.00 ; S S=50 ; S S R=2 ; ~ ז 2=.5$ | -0.0004 | -0.0008 | -0.0005 | 0.907 | 0.909 | 0.91 | 0.056 | 0.056 | 0.056 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | -0.0165 | -0.0163 | -0.0164 | 0.914 | 0.912 | 0.914 | 0.058 | 0.058 | 0.058 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | 0.0045 | 0.0044 | 0.0045 | 0.922 | 0.921 | 0.923 | 0.054 | 0.054 | 0.054 |
| TX = 1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.5$ | -0.0051 | -0.005 | -0.0052 | 0.895 | 0.896 | 0.897 | 0.057 | 0.057 | 0.057 |
| TX = 1; $\rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.003 | -0.0033 | -0.0025 | 0.968 | 0.946 | 0.94 | 0.005 | 0.005 | 0.005 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0031 | -0.0029 | -0.003 | 0.976 | 0.967 | 0.964 | 0.003 | 0.003 | 0.003 |
| TX = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.001 | 0.0012 | 0.001 | 0.954 | 0.966 | 0.974 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0004 | 0.0003 | 0.0005 | 0.962 | 0.973 | 0.995 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | -0.0008 | -0.001 | -0.0008 | 0.923 | 0.92 | 0.922 | 0.015 | 0.015 | 0.015 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | 0.0036 | 0.0037 | 0.0036 | 0.933 | 0.935 | 0.934 | 0.012 | 0.012 | 0.012 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | -0.0012 | -0.0012 | -0.0012 | 0.925 | 0.927 | 0.922 | 0.012 | 0.011 | 0.012 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.1$ | -0.0007 | -0.0009 | -0.0007 | 0.931 | 0.929 | 0.932 | 0.011 | 0.011 | 0.011 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | 0.0014 | 0.0015 | 0.0015 | 0.915 | 0.918 | 0.916 | 0.053 | 0.053 | 0.053 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | 0.0015 | 0.0014 | 0.0014 | 0.918 | 0.918 | 0.917 | 0.051 | 0.051 | 0.051 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | -0.0067 | -0.0067 | -0.0067 | 0.922 | 0.921 | 0.922 | 0.055 | 0.055 | 0.055 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ 72=.5$ | -0.0026 | -0.0025 | -0.0026 | 0.928 | 0.922 | 0.924 | 0.051 | 0.051 | 0.051 |
| TX $=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0009 | -0.0009 | -0.0009 | 0.965 | 0.936 | 0.932 | 0.004 | 0.004 | 0.004 |
| TX = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0002 | 0.0002 | 0.0003 | 0.951 | 0.949 | 0.944 | 0.002 | 0.002 | 0.002 |


| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0006 | 0.0007 | 0.0008 | 0.958 | 0.962 | 0.966 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{r} 2=0$ | 0.0003 | -0.0002 | 0.0003 | 0.96 | 0.968 | 1 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0036 | 0.0036 | 0.0037 | 0.922 | 0.916 | 0.921 | 0.013 | 0.013 | 0.013 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0027 | 0.0027 | 0.0026 | 0.918 | 0.918 | 0.918 | 0.012 | 0.012 | 0.012 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.1$ | -0.0021 | -0.0021 | -0.0021 | 0.923 | 0.923 | 0.925 | 0.011 | 0.011 | 0.011 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0007 | -0.0005 | -0.0008 | 0.92 | 0.918 | 0.922 | 0.011 | 0.011 | 0.011 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.5$ | -0.0028 | -0.0028 | -0.0028 | 0.907 | 0.916 | 0.906 | 0.056 | 0.056 | 0.056 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ \mathrm{t} 2=.5$ | 0.0034 | 0.0034 | 0.0035 | 0.908 | 0.911 | 0.908 | 0.054 | 0.054 | 0.054 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; ~ 72=.5$ | -0.0075 | -0.0075 | -0.0075 | 0.914 | 0.914 | 0.914 | 0.052 | 0.052 | 0.052 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0001 | -0.0001 | 0 | 0.924 | 0.915 | 0.926 | 0.05 | 0.05 | 0.05 |

Simulation results: $\mathbf{2 0}$ studies per meta-analysis, fixed effect

| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX = 0; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0016 | 0.0001 | 0.0011 | 0.937 | 0.872 | 0.836 | 0.01 | 0.011 | 0.01 |
| Tx = 0; $\rho=0.40 ;$ SS = 20; SSR $=1 ; ~ \tau 2=0$ | -0.0032 | -0.0033 | -0.0036 | 0.935 | 0.927 | 0.92 | 0.007 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0033 | -0.0034 | -0.0037 | 0.939 | 0.954 | 0.969 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0008 | -0.001 | -0.001 | 0.933 | 0.965 | 1 | 0.002 | 0.002 | 0.002 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \tau 2=.1$ | -0.0023 | -0.0003 | -0.0016 | 0.863 | 0.786 | 0.729 | 0.015 | 0.016 | 0.015 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0055 | 0.0054 | 0.0059 | 0.841 | 0.821 | 0.81 | 0.011 | 0.011 | 0.01 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \tau 2=.1$ | 0.0033 | 0.0025 | 0.0026 | 0.796 | 0.826 | 0.844 | 0.009 | 0.009 | 0.009 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ 22=.1$ | 0.0005 | 0.0014 | -0.0002 | 0.673 | 0.726 | 0.871 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0056 | 0.0061 | 0.0052 | 0.654 | 0.579 | 0.516 | 0.038 | 0.041 | 0.038 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0005 | -0.0033 | -0.0018 | 0.565 | 0.543 | 0.527 | 0.034 | 0.033 | 0.032 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0019 | -0.001 | -0.0021 | 0.522 | 0.55 | 0.588 | 0.03 | 0.03 | 0.029 |
| TX $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0022 | -0.0009 | -0.0027 | 0.361 | 0.413 | 0.561 | 0.029 | 0.034 | 0.029 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0064 | 0.0069 | 0.006 | 0.923 | 0.859 | 0.805 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; \tau 2=0$ | -0.0036 | -0.0037 | -0.0041 | 0.931 | 0.928 | 0.92 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0011 | -0.0013 | -0.0006 | 0.936 | 0.95 | 0.963 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ \tau 2=0$ | 0 | 0.0013 | 0 | 0.942 | 0.963 | 0.997 | 0.001 | 0.002 | 0.001 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; \tau 2=.1$ | 0.0012 | 0.0029 | 0.0018 | 0.859 | 0.76 | 0.721 | 0.012 | 0.014 | 0.012 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0013 | -0.0014 | -0.0021 | 0.8 | 0.795 | 0.781 | 0.009 | 0.009 | 0.009 |
| Tx = 0; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.1$ | -0.0039 | -0.0029 | -0.0035 | 0.741 | 0.765 | 0.801 | 0.009 | 0.009 | 0.009 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0001 | 0.001 | 0.0004 | 0.62 | 0.667 | 0.859 | 0.007 | 0.008 | 0.007 |
| Tx = 0; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0049 | 0.0042 | 0.0051 | 0.637 | 0.545 | 0.504 | 0.032 | 0.034 | 0.031 |
| Tx = 0; $\rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.007 | 0.0092 | 0.0102 | 0.554 | 0.527 | 0.536 | 0.03 | 0.03 | 0.029 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ \tau 2=.5$ | -0.0071 | -0.006 | -0.0088 | 0.479 | 0.489 | 0.535 | 0.028 | 0.028 | 0.028 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0012 | 0.0034 | 0.0024 | 0.3 | 0.368 | 0.496 | 0.031 | 0.038 | 0.03 |
| Tx $=0 ; \rho=0.00 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=0$ | 0.0031 | 0.0032 | 0.003 | 0.949 | 0.859 | 0.825 | 0.004 | 0.005 | 0.004 |
| Tx = 0; $\rho=0.40 ;$ SS = $0 ; ~ S S R=1 ; ~ \tau 2=0$ | 0.0002 | 0.0002 | 0.0004 | 0.953 | 0.943 | 0.931 | 0.002 | 0.002 | 0.002 |


| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=0$ | -0.0019 | -0.002 | -0.0018 | 0.94 | 0.947 | 0.964 | 0.002 | 0.002 | 0.002 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0004 | 0.0007 | 0.0004 | 0.948 | 0.963 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0045 | 0.0046 | 0.0044 | 0.8 | 0.686 | 0.649 | 0.009 | 0.01 | 0.009 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0008 | 0.001 | 0.0012 | 0.721 | 0.681 | 0.671 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ \tau 2=.1$ | 0.0034 | 0.0028 | 0.0034 | 0.657 | 0.677 | 0.704 | 0.007 | 0.007 | 0.007 |
| TX $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0008 | 0.0016 | 0.0008 | 0.518 | 0.559 | 0.74 | 0.006 | 0.007 | 0.006 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ ז 2=.5$ | -0.0039 | -0.002 | -0.0041 | 0.517 | 0.434 | 0.386 | 0.03 | 0.033 | 0.03 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0.0022 | 0.0022 | 0.0026 | 0.409 | 0.399 | 0.385 | 0.028 | 0.028 | 0.028 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ \tau 2=.5$ | 0.0046 | 0.0037 | 0.0047 | 0.356 | 0.376 | 0.379 | 0.029 | 0.029 | 0.029 |
| TX $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0 | -0.0003 | 0.0003 | 0.276 | 0.293 | 0.419 | 0.026 | 0.031 | 0.026 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | 0.0003 | 0 | 0.0005 | 0.943 | 0.866 | 0.83 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ t 2=0$ | 0.0023 | 0.0022 | 0.0021 | 0.947 | 0.939 | 0.932 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0021 | -0.0021 | -0.0021 | 0.94 | 0.952 | 0.968 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=0$ | -0.0013 | -0.0005 | -0.0011 | 0.941 | 0.969 | 0.997 | 0.001 | 0.001 | 0.001 |
| $\mathrm{T} X=0 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0021 | 0.0006 | 0.0025 | 0.76 | 0.646 | 0.594 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ ז 2=.1$ | -0.0004 | -0.0003 | -0.0004 | 0.682 | 0.668 | 0.651 | 0.007 | 0.007 | 0.007 |
| TX $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; ~ \tau 2=.1$ | 0.0011 | 0.0014 | 0.0014 | 0.586 | 0.609 | 0.641 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ ז 2=.1$ | 0.0027 | 0.004 | 0.0036 | 0.455 | 0.489 | 0.687 | 0.006 | 0.007 | 0.006 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ ז 2=.5$ | 0.0142 | 0.0157 | 0.0147 | 0.513 | 0.406 | 0.382 | 0.029 | 0.033 | 0.029 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ ז 2=.5$ | 0.0055 | 0.0049 | 0.0055 | 0.372 | 0.371 | 0.353 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | -0.0026 | -0.0024 | -0.0019 | 0.323 | 0.335 | 0.357 | 0.027 | 0.028 | 0.027 |
| Tx = 0; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \tau 2=.5$ | 0.0117 | 0.0161 | 0.0118 | 0.21 | 0.263 | 0.357 | 0.027 | 0.031 | 0.027 |
| Tx = 0; $\rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0004 | -0.0006 | -0.0002 | 0.955 | 0.881 | 0.85 | 0.002 | 0.002 | 0.002 |
| Tx = 0; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{r} 2=0$ | -0.0001 | 0 | 0 | 0.952 | 0.943 | 0.931 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ \tau 2=0$ | -0.0003 | -0.0002 | -0.0003 | 0.953 | 0.96 | 0.966 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ; S S=100 ; S S R=1 ; ~ \tau 2=0$ | -0.0004 | -0.0002 | -0.0004 | 0.94 | 0.965 | 0.999 | 0 | 0 | 0 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | -0.0015 | -0.0024 | -0.0016 | 0.723 | 0.612 | 0.57 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | 0.0016 | 0.002 | 0.0015 | 0.581 | 0.558 | 0.542 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \tau 2=.1$ | -0.0012 | -0.0013 | -0.0011 | 0.561 | 0.58 | 0.598 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.1$ | 0.0061 | 0.0078 | 0.0064 | 0.39 | 0.45 | 0.606 | 0.005 | 0.006 | 0.005 |

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| Tx = 0; $\rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | $-0.0051$ | -0.0046 | -0.005 | 0.401 | 0.328 | 0.289 | 0.027 | 0.03 | 0.027 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 0; $\rho=0.40 ; ~ S S=100 ; S S R=1 ; ~ T 2=.5$ | $-0.0009$ | -0.0001 | 0.0001 | 0.336 | 0.314 | 0.316 | 0.025 | 0.025 | 0.025 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0003 | 0.0004 | 0.0008 | 0.263 | 0.273 | 0.287 | 0.028 | 0.028 | 0.027 |
| Tx = 0; $\rho=0.81 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | $-0.0017$ | -0.005 | -0.0025 | 0.192 | 0.197 | 0.306 | 0.025 | 0.03 | 0.025 |
| TX $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0015 | 0.0017 | 0.0015 | 0.946 | 0.875 | 0.838 | 0.002 | 0.002 | 0.002 |
| TX $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0003 | -0.0003 | -0.0003 | 0.951 | 0.94 | 0.932 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0004 | -0.0004 | -0.0005 | 0.94 | 0.949 | 0.961 | 0.001 | 0.001 | 0.001 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=0$ | 0 | 0.0001 | 0 | 0.933 | 0.958 | 0.998 | 0 | 0 | 0 |
| Tx = 0; $\rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0011 | 0.0013 | 0.0012 | 0.643 | 0.532 | 0.485 | 0.007 | 0.007 | 0.007 |
| Tx = 0; $\rho=0.40 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=.1$ | -0.0003 | -0.0001 | -0.0004 | 0.568 | 0.557 | 0.536 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0008 | -0.0008 | -0.0009 | 0.508 | 0.527 | 0.549 | 0.005 | 0.005 | 0.005 |
| Tx = 0; $\rho=0.81 ;$ SS = $100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.1$ | -0.004 | -0.0039 | -0.0038 | 0.349 | 0.371 | 0.551 | 0.006 | 0.007 | 0.006 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | -0.0012 | -0.001 | -0.0011 | 0.343 | 0.28 | 0.239 | 0.026 | 0.029 | 0.026 |
| Tx = 0; $\rho=0.40 ;$ SS = $100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.006 | 0.0055 | 0.0059 | 0.296 | 0.279 | 0.271 | 0.024 | 0.024 | 0.023 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0056 | 0.0059 | 0.0058 | 0.222 | 0.238 | 0.252 | 0.027 | 0.027 | 0.027 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.5$ | -0.0037 | -0.003 | -0.0033 | 0.168 | 0.189 | 0.282 | 0.022 | 0.028 | 0.022 |
| Tx $=.1 ; \rho=0.00 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0012 | 0.0026 | 0.0011 | 0.946 | 0.873 | 0.824 | 0.01 | 0.011 | 0.01 |
| Tx $=.1 ; \rho=0.40 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0008 | 0.0005 | 0.0004 | 0.936 | 0.931 | 0.919 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T}=0$ | 0.0013 | 0.0016 | 0.0015 | 0.94 | 0.952 | 0.965 | 0.004 | 0.004 | 0.004 |
| Tx $=.1 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0007 | -0.0013 | -0.0006 | 0.932 | 0.956 | 0.998 | 0.002 | 0.003 | 0.002 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0052 | -0.0043 | -0.0054 | 0.872 | 0.784 | 0.75 | 0.016 | 0.017 | 0.015 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0012 | -0.0013 | -0.0019 | 0.858 | 0.832 | 0.822 | 0.011 | 0.011 | 0.01 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | $-0.0006$ | -0.0005 | -0.0004 | 0.782 | 0.8 | 0.837 | 0.01 | 0.01 | 0.01 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0014 | 0.0033 | 0.0016 | 0.658 | 0.708 | 0.879 | 0.008 | 0.009 | 0.007 |
| Tx = $1 ; 1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.004 | -0.0011 | -0.0041 | 0.688 | 0.577 | 0.546 | 0.036 | 0.038 | 0.034 |
| Tx = $1 ; ~ \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0002 | 0.0002 | 0.0003 | 0.604 | 0.592 | 0.592 | 0.031 | 0.031 | 0.031 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0103 | 0.0093 | 0.0073 | 0.524 | 0.532 | 0.568 | 0.03 | 0.031 | 0.031 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0035 | 0.0009 | 0.0016 | 0.395 | 0.421 | 0.568 | 0.029 | 0.035 | 0.029 |
| Tx = .1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | $-0.0037$ | -0.0029 | -0.0037 | 0.932 | 0.878 | 0.85 | 0.008 | 0.008 | 0.008 |
| Tx $=.1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0031 | 0.0033 | 0.0029 | 0.923 | 0.91 | 0.909 | 0.005 | 0.005 | 0.005 |


| Tx = . $1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0054 | $-0.0057$ | $-0.0057$ | 0.933 | 0.935 | 0.958 | 0.003 | 0.003 | 0.003 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0004 | -0.0003 | -0.0004 | 0.948 | 0.963 | 0.999 | 0.001 | 0.002 | 0.001 |
| $\mathrm{T} x=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0003 | 0.0021 | -0.0008 | 0.834 | 0.717 | 0.676 | 0.015 | 0.017 | 0.015 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0005 | -0.0003 | 0.0001 | 0.798 | 0.774 | 0.773 | 0.01 | 0.01 | 0.01 |
| $\mathrm{TX}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0022 | -0.0022 | -0.0032 | 0.744 | 0.773 | 0.811 | 0.009 | 0.009 | 0.009 |
| $\mathrm{TX}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0039 | 0.0025 | 0.004 | 0.63 | 0.669 | 0.845 | 0.007 | 0.008 | 0.007 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0029 | 0.0003 | 0.0027 | 0.61 | 0.53 | 0.502 | 0.035 | 0.038 | 0.034 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0013 | 0.0012 | 0.0006 | 0.566 | 0.542 | 0.524 | 0.03 | 0.03 | 0.03 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0013 | 0.002 | 0.0015 | 0.441 | 0.481 | 0.499 | 0.031 | 0.031 | 0.031 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0043 | 0.0046 | 0.0035 | 0.324 | 0.38 | 0.516 | 0.028 | 0.034 | 0.028 |
| Tx = . $1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0006 | 0 | -0.0001 | 0.941 | 0.869 | 0.82 | 0.004 | 0.005 | 0.004 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0006 | $-0.0005$ | -0.0002 | 0.947 | 0.939 | 0.933 | 0.002 | 0.002 | 0.002 |
| Tx = . $1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.001 | 0.0011 | 0.001 | 0.946 | 0.957 | 0.972 | 0.002 | 0.002 | 0.002 |
| Tx = . $1 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0002 | -0.0004 | -0.0001 | 0.94 | 0.964 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = . $1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ \mathrm{~T}=.1$ | 0.0004 | 0.002 | 0.0005 | 0.8 | 0.685 | 0.65 | 0.009 | 0.01 | 0.009 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.001 | -0.0009 | -0.001 | 0.741 | 0.717 | 0.701 | 0.007 | 0.007 | 0.007 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0017 | -0.0016 | -0.0018 | 0.67 | 0.694 | 0.703 | 0.007 | 0.007 | 0.007 |
| Tx = . $1 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0006 | 0.0008 | 0.0004 | 0.494 | 0.545 | 0.761 | 0.006 | 0.007 | 0.006 |
| Tx = . $1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | $-0.0026$ | -0.0059 | -0.0025 | 0.529 | 0.444 | 0.396 | 0.028 | 0.031 | 0.028 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0023 | -0.0016 | -0.001 | 0.441 | 0.422 | 0.415 | 0.028 | 0.029 | 0.028 |
| Tx = . $1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0011 | 0.0009 | 0.0007 | 0.391 | 0.401 | 0.421 | 0.026 | 0.026 | 0.026 |
| Tx = . $1 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0015 | 0.005 | 0.0015 | 0.258 | 0.275 | 0.394 | 0.027 | 0.032 | 0.027 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0005 | -0.0009 | -0.0004 | 0.951 | 0.866 | 0.836 | 0.003 | 0.003 | 0.003 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0002 | 0.0005 | 0.0002 | 0.942 | 0.934 | 0.928 | 0.002 | 0.002 | 0.002 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0011 | 0.0009 | 0.001 | 0.946 | 0.958 | 0.97 | 0.001 | 0.001 | 0.001 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0002 | -0.0005 | -0.0001 | 0.936 | 0.965 | 0.997 | 0.001 | 0.001 | 0.001 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.006 | 0.0044 | 0.0061 | 0.781 | 0.669 | 0.627 | 0.008 | 0.008 | 0.008 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0012 | -0.0015 | -0.0011 | 0.684 | 0.66 | 0.657 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0003 | 0.0002 | -0.0003 | 0.593 | 0.62 | 0.646 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0037 | -0.0032 | -0.0044 | 0.46 | 0.497 | 0.688 | 0.005 | 0.007 | 0.005 |

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| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0038 | 0.0051 | 0.0026 | 0.488 | 0.391 | 0.373 | 0.028 | 0.031 | 0.028 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0029 | 0.0021 | 0.003 | 0.382 | 0.359 | 0.341 | 0.026 | 0.026 | 0.026 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0021 | 0.0024 | 0.0023 | 0.338 | 0.349 | 0.367 | 0.025 | 0.025 | 0.025 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0072 | -0.0046 | -0.0074 | 0.239 | 0.259 | 0.346 | 0.026 | 0.029 | 0.025 |
| $T X=.1 ; \rho=0.00 ; ~ S S=100 ; S S R=1 ; T 2=0$ | -0.0014 | -0.0022 | -0.0014 | 0.957 | 0.872 | 0.845 | 0.002 | 0.002 | 0.002 |
| $T X=.1 ; \rho=0.40 ; ~ S S=100 ; S S R=1 ; T 2=0$ | 0.0002 | 0.0001 | 0.0001 | 0.957 | 0.944 | 0.936 | 0.001 | 0.001 | 0.001 |
| $T X=.1 ; \rho=0.59 ;$ SS $=100 ; S S R=1 ; T_{2}=0$ | 0.0003 | 0.0004 | 0.0003 | 0.952 | 0.959 | 0.969 | 0.001 | 0.001 | 0.001 |
| $T X=.1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; T_{2}=0$ | 0.0007 | 0.0008 | 0.0007 | 0.95 | 0.974 | 0.999 | 0 | 0 | 0 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0019 | $-0.0015$ | -0.002 | 0.699 | 0.568 | 0.546 | 0.007 | 0.008 | 0.007 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0043 | -0.004 | -0.004 | 0.592 | 0.572 | 0.56 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0005 | $-0.0006$ | -0.0003 | 0.501 | 0.531 | 0.55 | 0.006 | 0.006 | 0.006 |
| TX $=.1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0013 | -0.0001 | 0.0015 | 0.405 | 0.432 | 0.595 | 0.006 | 0.007 | 0.006 |
| Tx $=.1 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0002 | 0.0022 | 0.0001 | 0.399 | 0.327 | 0.291 | 0.027 | 0.031 | 0.028 |
| TX = . $; \rho=0.40 ;$ SS $=100 ; S S R=1 ; ~ T 2=.5$ | -0.0012 | -0.0005 | -0.0001 | 0.323 | 0.319 | 0.298 | 0.027 | 0.027 | 0.027 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0025 | -0.0029 | -0.0028 | 0.298 | 0.314 | 0.335 | 0.026 | 0.026 | 0.026 |
| TX $=.1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | -0.0094 | -0.0133 | -0.0093 | 0.177 | 0.194 | 0.283 | 0.027 | 0.032 | 0.027 |
| TX $=.1 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.001 | -0.0013 | -0.001 | 0.942 | 0.862 | 0.809 | 0.002 | 0.002 | 0.002 |
| $T X=.1 ; \rho=0.40 ; ~ S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0002 | 0.0002 | 0.0002 | 0.94 | 0.926 | 0.922 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.0002 | -0.0001 | -0.0003 | 0.948 | 0.959 | 0.967 | 0.001 | 0.001 | 0.001 |
| TX $=.1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0008 | 0.0004 | 0.0009 | 0.947 | 0.969 | 0.998 | 0 | 0 | 0 |
| TX $=.1 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0014 | 0.001 | 0.0019 | 0.628 | 0.517 | 0.458 | 0.007 | 0.008 | 0.007 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}=.1$ | -0.0001 | 0 | 0.0001 | 0.53 | 0.501 | 0.485 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0003 | -0.0001 | -0.001 | 0.488 | 0.506 | 0.517 | 0.006 | 0.006 | 0.006 |
| TX $=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}=.1$ | $-0.0003$ | 0.0012 | -0.0002 | 0.358 | 0.375 | 0.523 | 0.005 | 0.006 | 0.005 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0052 | -0.0055 | -0.0049 | 0.35 | 0.275 | 0.249 | 0.028 | 0.031 | 0.028 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}=.5$ | 0.0045 | 0.0045 | 0.0049 | 0.288 | 0.286 | 0.266 | 0.027 | 0.028 | 0.027 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T}=.5$ | 0.0088 | 0.0094 | 0.0085 | 0.209 | 0.232 | 0.249 | 0.025 | 0.025 | 0.024 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0018 | -0.0049 | -0.0019 | 0.148 | 0.178 | 0.243 | 0.026 | 0.03 | 0.026 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0009 | 0.0007 | 0.001 | 0.936 | 0.857 | 0.818 | 0.011 | 0.011 | 0.01 |
| Tx $=.5 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0011 | 0.0008 | 0.0006 | 0.949 | 0.937 | 0.932 | 0.006 | 0.006 | 0.006 |


| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0021 | -0.0017 | -0.0022 | 0.934 | 0.947 | 0.972 | 0.004 | 0.004 | 0.004 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0009 | 0.0023 | 0.0013 | 0.939 | 0.958 | 0.999 | 0.002 | 0.002 | 0.002 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0014 | -0.0009 | -0.0014 | 0.862 | 0.772 | 0.728 | 0.017 | 0.018 | 0.016 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0056 | -0.0053 | -0.0052 | 0.837 | 0.814 | 0.811 | 0.011 | 0.012 | 0.011 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0027 | 0.0023 | 0.0017 | 0.798 | 0.82 | 0.851 | 0.009 | 0.009 | 0.009 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=.1$ | $-0.0036$ | -0.0028 | -0.0051 | 0.656 | 0.721 | 0.881 | 0.008 | 0.009 | 0.007 |
| $T x=.5 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0 | -0.0013 | -0.0012 | 0.699 | 0.594 | 0.566 | 0.035 | 0.039 | 0.035 |
| Tx = . $5 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0076 | 0.0082 | 0.0084 | 0.591 | 0.572 | 0.562 | 0.032 | 0.032 | 0.032 |
| $\mathrm{TX}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0037 | -0.0038 | -0.0039 | 0.501 | 0.521 | 0.568 | 0.032 | 0.032 | 0.031 |
| TX = . $5 ; \rho=0.81 ;$ SS $=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0029 | -0.0008 | -0.004 | 0.388 | 0.406 | 0.589 | 0.029 | 0.035 | 0.029 |
| Tx = . $; ~ \rho=0.00 ;$ SS =20; SSR $=2 ; \mathrm{T} 2=0$ | 0.004 | 0.0061 | 0.0042 | 0.934 | 0.878 | 0.812 | 0.008 | 0.009 | 0.008 |
| $T x=.5 ; \rho=0.40 ; S S=20 ; S S R=2 ; T 2=0$ | 0.0007 | 0.0012 | 0.0006 | 0.94 | 0.924 | 0.917 | 0.005 | 0.005 | 0.005 |
| $T x=.5 ; \rho=0.59 ; S S=20 ; S S R=2 ; T 2=0$ | -0.003 | -0.0026 | -0.0028 | 0.937 | 0.95 | 0.965 | 0.003 | 0.003 | 0.003 |
| $T x=.5 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | 0.0006 | 0.0011 | 0.0009 | 0.931 | 0.95 | 0.997 | 0.002 | 0.002 | 0.002 |
| $T x=.5 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | $-0.0054$ | -0.004 | -0.0047 | 0.846 | 0.744 | 0.698 | 0.014 | 0.014 | 0.013 |
| Tx = . $5 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0003 | 0.0005 | 0.0004 | 0.811 | 0.798 | 0.779 | 0.01 | 0.009 | 0.009 |
| Tx = . $5 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.1$ | $-0.0015$ | -0.0021 | -0.0009 | 0.76 | 0.779 | 0.812 | 0.008 | 0.008 | 0.008 |
| $T x=.5 ; \rho=0.81 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0041 | -0.0063 | -0.003 | 0.616 | 0.664 | 0.861 | 0.007 | 0.008 | 0.007 |
| $T x=.5 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0014 | -0.0014 | -0.0017 | 0.612 | 0.522 | 0.477 | 0.036 | 0.039 | 0.035 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0091 | -0.0084 | -0.0079 | 0.528 | 0.504 | 0.493 | 0.031 | 0.031 | 0.031 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0014 | -0.0002 | -0.0015 | 0.456 | 0.464 | 0.494 | 0.029 | 0.029 | 0.029 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0009 | -0.0056 | -0.0022 | 0.33 | 0.374 | 0.514 | 0.028 | 0.032 | 0.028 |
| $T x=.5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0021 | -0.0014 | -0.0019 | 0.941 | 0.87 | 0.837 | 0.004 | 0.005 | 0.004 |
| $T x=.5 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0014 | -0.0013 | -0.0016 | 0.96 | 0.944 | 0.938 | 0.002 | 0.002 | 0.002 |
| Tx = . $5 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0014 | -0.0018 | -0.0016 | 0.948 | 0.967 | 0.975 | 0.002 | 0.002 | 0.002 |
| Tx = . $5 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0002 | -0.0006 | -0.0001 | 0.933 | 0.957 | 0.995 | 0.001 | 0.001 | 0.001 |
| Tx = . $5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0008 | 0.0017 | 0.0007 | 0.79 | 0.661 | 0.62 | 0.01 | 0.011 | 0.01 |
| $T x=.5 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | $-0.0012$ | -0.001 | -0.0007 | 0.738 | 0.722 | 0.712 | 0.008 | 0.008 | 0.007 |
| Tx = . $5 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | $-0.0014$ | -0.0016 | -0.0013 | 0.671 | 0.697 | 0.724 | 0.006 | 0.007 | 0.006 |
| Tx $=.5 ; \rho=0.81 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | $-0.0007$ | 0.0005 | -0.0005 | 0.543 | 0.581 | 0.768 | 0.006 | 0.007 | 0.006 |


| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0093 | -0.0117 | -0.0101 | 0.542 | 0.419 | 0.409 | 0.03 | 0.032 | 0.03 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0023 | 0.002 | 0.003 | 0.413 | 0.406 | 0.376 | 0.028 | 0.028 | 0.028 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0015 | 0.0015 | 0.0017 | 0.351 | 0.374 | 0.391 | 0.028 | 0.028 | 0.027 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0057 | -0.002 | -0.0064 | 0.269 | 0.292 | 0.425 | 0.024 | 0.03 | 0.024 |
| TX $=.5 ; \rho=0.00 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0007 | 0.0004 | 0.0008 | 0.928 | 0.85 | 0.817 | 0.003 | 0.004 | 0.003 |
| TX $=.5 ; \rho=0.40 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | 0 | -0.0002 | -0.0003 | 0.947 | 0.938 | 0.936 | 0.002 | 0.002 | 0.002 |
| Tx $=.5 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=2 ; \mathrm{T}^{2}=0$ | 0.001 | 0.0007 | 0.0008 | 0.945 | 0.962 | 0.968 | 0.001 | 0.001 | 0.001 |
| Tx $=.5 ; \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0006 | 0.0004 | 0.0004 | 0.945 | 0.961 | 0.996 | 0.001 | 0.001 | 0.001 |
| Tx = . $; ~ \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0013 | 0.0017 | 0.0013 | 0.752 | 0.638 | 0.587 | 0.009 | 0.009 | 0.009 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0037 | $-0.0042$ | -0.0039 | 0.676 | 0.664 | 0.648 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0022 | -0.0017 | -0.0014 | 0.618 | 0.645 | 0.671 | 0.006 | 0.006 | 0.006 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0002 | -0.0004 | -0.0003 | 0.469 | 0.518 | 0.675 | 0.006 | 0.007 | 0.006 |
| Tx = . $5 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0125 | -0.0133 | -0.0119 | 0.473 | 0.392 | 0.358 | 0.026 | 0.029 | 0.026 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0079 | 0.0078 | 0.0078 | 0.391 | 0.377 | 0.353 | 0.029 | 0.029 | 0.028 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.001 | -0.0006 | -0.0011 | 0.336 | 0.35 | 0.383 | 0.025 | 0.025 | 0.025 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0029 | 0.0015 | 0.0024 | 0.222 | 0.241 | 0.358 | 0.026 | 0.032 | 0.026 |
| TX $=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | 0.0014 | 0.0014 | 0.0013 | 0.952 | 0.881 | 0.84 | 0.002 | 0.002 | 0.002 |
| $T X=.5 ; \rho=0.40 ;$ SS $=100 ; S S R=1 ; ~ T 2=0$ | -0.0021 | -0.0021 | -0.0021 | 0.954 | 0.936 | 0.923 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T}^{2}=0$ | 0 | 0.0002 | 0.0001 | 0.951 | 0.956 | 0.967 | 0.001 | 0.001 | 0.001 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | 0.0014 | 0.0016 | 0.0013 | 0.94 | 0.964 | 1 | 0 | 0 | 0 |
| TX $=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.001 | $-0.0017$ | -0.001 | 0.695 | 0.581 | 0.552 | 0.007 | 0.008 | 0.007 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0018 | -0.0013 | -0.0016 | 0.599 | 0.573 | 0.549 | 0.006 | 0.006 | 0.006 |
| Tx $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | $-0.0003$ | 0 | 0.0003 | 0.548 | 0.568 | 0.589 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ; S S R=1 ; ~ T 2=.1$ | 0.0034 | 0.0021 | 0.0027 | 0.376 | 0.426 | 0.568 | 0.006 | 0.007 | 0.006 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0025 | -0.0014 | -0.0031 | 0.402 | 0.336 | 0.298 | 0.028 | 0.03 | 0.028 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0002 | 0.0007 | 0.0002 | 0.326 | 0.316 | 0.305 | 0.026 | 0.026 | 0.026 |
| $T \mathrm{X}=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | 0.0007 | 0.0004 | 0.0002 | 0.276 | 0.278 | 0.289 | 0.027 | 0.027 | 0.027 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | -0.0041 | -0.0066 | -0.0048 | 0.196 | 0.208 | 0.29 | 0.026 | 0.031 | 0.026 |
| $T \mathrm{X}=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}_{2}=0$ | -0.0008 | -0.0009 | -0.0008 | 0.95 | 0.872 | 0.83 | 0.001 | 0.002 | 0.001 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0017 | -0.0017 | -0.0018 | 0.934 | 0.922 | 0.908 | 0.001 | 0.001 | 0.001 |


| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; T_{2}=0$ | -0.0006 | -0.0007 | $-0.0007$ | 0.934 | 0.943 | 0.963 | 0.001 | 0.001 | 0.001 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T X=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}_{2}=0$ | -0.0001 | 0 | -0.0001 | 0.954 | 0.977 | 0.998 | 0 | 0 | 0 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0035 | 0.0032 | 0.0036 | 0.66 | 0.548 | 0.513 | 0.006 | 0.007 | 0.006 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0015 | 0.0017 | 0.0017 | 0.573 | 0.554 | 0.538 | 0.006 | 0.006 | 0.006 |
| $\mathrm{TX}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0009 | 0.0011 | 0.0012 | 0.475 | 0.502 | 0.519 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0008 | 0.0014 | 0.0012 | 0.347 | 0.371 | 0.533 | 0.005 | 0.006 | 0.005 |
| $T X=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; S S R=2 ; \mathrm{T}^{2}=.5$ | -0.0038 | -0.0041 | -0.004 | 0.361 | 0.294 | 0.244 | 0.026 | 0.028 | 0.026 |
| $T X=.5 ; \rho=0.40 ;$ SS $=100 ; S S R=2 ; T 2=.5$ | 0.0079 | 0.0073 | 0.0076 | 0.248 | 0.231 | 0.223 | 0.027 | 0.028 | 0.027 |
| $T X=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; T^{2}=.5$ | 0.0086 | 0.0088 | 0.0087 | 0.242 | 0.252 | 0.274 | 0.025 | 0.025 | 0.025 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.5$ | 0.0014 | 0.0027 | 0.0013 | 0.165 | 0.17 | 0.26 | 0.025 | 0.03 | 0.025 |
| TX $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0052 | 0.0033 | 0.005 | 0.941 | 0.87 | 0.837 | 0.01 | 0.011 | 0.01 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0022 | 0.0029 | 0.003 | 0.927 | 0.917 | 0.909 | 0.007 | 0.007 | 0.007 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0038 | -0.0035 | -0.004 | 0.93 | 0.951 | 0.968 | 0.004 | 0.004 | 0.004 |
| TX $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=0$ | 0.0014 | 0.0028 | 0.0016 | 0.947 | 0.956 | 0.998 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0031 | 0.0013 | 0.0028 | 0.864 | 0.759 | 0.716 | 0.016 | 0.017 | 0.016 |
| Tx = 1; $\rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0044 | -0.0045 | -0.0047 | 0.849 | 0.827 | 0.826 | 0.011 | 0.011 | 0.01 |
| Tx = 1; $\rho=0.59 ;$ SS =20; SSR =1; $\mathrm{T} 2=.1$ | 0.001 | 0.0011 | 0.0009 | 0.765 | 0.793 | 0.83 | 0.01 | 0.01 | 0.01 |
| Tx = 1; $\rho=0.81 ;$ SS =20; SSR $=1 ; ~ T 2=.1$ | -0.0024 | -0.0028 | -0.0024 | 0.687 | 0.718 | 0.893 | 0.007 | 0.009 | 0.007 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0028 | -0.0026 | -0.0022 | 0.676 | 0.569 | 0.524 | 0.037 | 0.04 | 0.037 |
| Tx = 1; $\rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0026 | 0.0018 | 0.0017 | 0.597 | 0.579 | 0.566 | 0.031 | 0.031 | 0.03 |
| Tx = 1; $\rho=0.59 ;$ SS =20; SSR $=1 ; ~ \mathrm{r} 2=.5$ | $-0.0081$ | -0.0068 | -0.0083 | 0.529 | 0.544 | 0.569 | 0.03 | 0.03 | 0.03 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{r} 2=.5$ | -0.0077 | $-0.0083$ | -0.0106 | 0.4 | 0.428 | 0.593 | 0.027 | 0.033 | 0.026 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0001 | -0.0003 | 0 | 0.949 | 0.893 | 0.85 | 0.007 | 0.008 | 0.007 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0013 | 0.0013 | 0.0009 | 0.936 | 0.937 | 0.929 | 0.005 | 0.005 | 0.005 |
| TX $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0011 | 0.0013 | 0.0006 | 0.921 | 0.933 | 0.958 | 0.003 | 0.003 | 0.003 |
| TX $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=0$ | $-0.0006$ | 0 | -0.0002 | 0.929 | 0.957 | 0.998 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0041 | -0.006 | -0.0029 | 0.869 | 0.759 | 0.711 | 0.013 | 0.014 | 0.012 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0069 | 0.0065 | 0.0057 | 0.809 | 0.795 | 0.775 | 0.009 | 0.009 | 0.009 |
| Tx = 1; $\rho=0.59 ;$ SS =20; SSR $=2 ; ~ T 2=.1$ | 0.0009 | 0.0013 | 0.0008 | 0.759 | 0.788 | 0.811 | 0.008 | 0.008 | 0.008 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0022 | $-0.0036$ | -0.0016 | 0.615 | 0.666 | 0.858 | 0.007 | 0.008 | 0.007 |


| Tx = 1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0117$ | -0.0108 | $-0.0087$ | 0.651 | 0.545 | 0.506 | 0.03 | 0.033 | 0.029 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0029 | 0.0051 | 0.0036 | 0.522 | 0.496 | 0.5 | 0.032 | 0.032 | 0.032 |
| Tx $=1 ; \rho=0.59 ;$ SS $=20 ; S S R=2 ; ~ T 2=.5$ | 0.002 | -0.0001 | 0.0016 | 0.489 | 0.505 | 0.525 | 0.03 | 0.029 | 0.029 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0082 | -0.0111 | -0.0065 | 0.342 | 0.351 | 0.52 | 0.03 | 0.037 | 0.03 |
| TX $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0016 | 0.0013 | 0.0013 | 0.95 | 0.877 | 0.835 | 0.004 | 0.004 | 0.004 |
| $\mathrm{TX}=1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0009 | 0.0007 | 0.0006 | 0.933 | 0.916 | 0.908 | 0.003 | 0.003 | 0.003 |
| Tx $=1 ; \rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0013 | 0.0012 | 0.0013 | 0.953 | 0.963 | 0.966 | 0.002 | 0.002 | 0.002 |
| TX $=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0024 | 0.0029 | 0.0022 | 0.925 | 0.958 | 0.996 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0012 | -0.0017 | -0.0011 | 0.8 | 0.66 | 0.639 | 0.009 | 0.01 | 0.009 |
| Tx = 1; $\rho=0.40 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | $-0.0006$ | -0.0007 | -0.0008 | 0.749 | 0.725 | 0.706 | 0.007 | 0.007 | 0.007 |
| Tx $=1 ; \rho=0.59 ;$ SS $=50 ; S S R=1 ; ~ T 2=.1$ | -0.0021 | -0.0025 | -0.0022 | 0.658 | 0.668 | 0.709 | 0.007 | 0.007 | 0.007 |
| Tx = 1; $\rho=0.81 ;$ SS =50; SSR =1; 212.1 | 0.0031 | 0.0032 | 0.0035 | 0.501 | 0.554 | 0.729 | 0.006 | 0.007 | 0.006 |
| Tx = 1; $\rho=0.00 ;$ SS $=50 ; S S R=1 ; ~ T 2=.5$ | -0.0041 | -0.0022 | -0.0034 | 0.517 | 0.431 | 0.398 | 0.03 | 0.032 | 0.03 |
| Tx = 1; $\rho=0.40 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0006 | -0.0003 | 0.0003 | 0.424 | 0.395 | 0.39 | 0.027 | 0.027 | 0.027 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=1 ; T 2=.5$ | $-0.0007$ | -0.001 | -0.0009 | 0.378 | 0.401 | 0.405 | 0.028 | 0.028 | 0.028 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0016 | -0.0015 | 0.0009 | 0.265 | 0.279 | 0.411 | 0.027 | 0.031 | 0.027 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0027 | -0.0024 | -0.0029 | 0.953 | 0.887 | 0.834 | 0.003 | 0.003 | 0.003 |
| $T x=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ t 2=0$ | 0.0006 | 0.0004 | 0.0006 | 0.952 | 0.934 | 0.925 | 0.002 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0 | -0.0001 | 0 | 0.938 | 0.946 | 0.962 | 0.001 | 0.001 | 0.001 |
| TX $=1 ; \rho=0.81 ;$ SS = 50; SSR $=2 ; \mathrm{T} 2=0$ | -0.0007 | -0.0007 | -0.0006 | 0.942 | 0.961 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ;$ SS $=50 ; \mathrm{SSR}=2 ; ~ T 2=.1$ | 0.0084 | 0.0071 | 0.0084 | 0.748 | 0.642 | 0.593 | 0.008 | 0.009 | 0.008 |
| Tx = 1; $\rho=0.40 ;$ SS $=50 ; \mathrm{SSR}=2 ; ~ T 2=.1$ | 0.0033 | 0.0032 | 0.0035 | 0.715 | 0.683 | 0.675 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0003$ | 0.0001 | -0.0004 | 0.638 | 0.655 | 0.682 | 0.006 | 0.006 | 0.006 |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0011 | -0.0018 | -0.0013 | 0.438 | 0.499 | 0.684 | 0.006 | 0.007 | 0.006 |
| Tx = 1; $\rho=0.00 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0056 | 0.0051 | 0.0061 | 0.482 | 0.392 | 0.355 | 0.028 | 0.031 | 0.028 |
| Tx = 1; $\rho=0.40 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0019 | -0.0016 | -0.0014 | 0.393 | 0.37 | 0.363 | 0.027 | 0.027 | 0.027 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0082$ | -0.0083 | -0.0084 | 0.336 | 0.363 | 0.383 | 0.026 | 0.026 | 0.026 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0091 | -0.0068 | -0.0103 | 0.245 | 0.281 | 0.356 | 0.026 | 0.03 | 0.026 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0011 | -0.0007 | -0.0009 | 0.95 | 0.894 | 0.831 | 0.002 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.40 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0007 | 0.0008 | 0.0008 | 0.952 | 0.937 | 0.929 | 0.001 | 0.001 | 0.001 |


| Tx $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | $-0.0004$ | -0.0005 | $-0.0005$ | 0.946 | 0.954 | 0.962 | 0.001 | 0.001 | 0.001 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX $=1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0002 | 0.0004 | 0.0001 | 0.955 | 0.969 | 0.999 | 0 | 0 | 0 |
| TX = 1; $\rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0.0001 | 0.0008 | -0.0002 | 0.694 | 0.574 | 0.527 | 0.007 | 0.008 | 0.007 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0031 | -0.0032 | -0.0029 | 0.633 | 0.61 | 0.6 | 0.006 | 0.006 | 0.006 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0006 | -0.0002 | 0.0001 | 0.556 | 0.564 | 0.6 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.002 | -0.001 | -0.0018 | 0.438 | 0.446 | 0.609 | 0.005 | 0.006 | 0.005 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.007 | 0.0086 | 0.0062 | 0.394 | 0.328 | 0.278 | 0.027 | 0.029 | 0.026 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0123 | -0.0121 | -0.0119 | 0.31 | 0.306 | 0.293 | 0.027 | 0.027 | 0.026 |
| Tx = 1; $\rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | $-0.0024$ | -0.0019 | -0.0019 | 0.269 | 0.282 | 0.305 | 0.026 | 0.026 | 0.026 |
| Tx = 1; $\rho=0.81 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0018 | -0.006 | -0.0024 | 0.195 | 0.208 | 0.321 | 0.025 | 0.03 | 0.025 |
| Tx $=1 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=0$ | -0.0003 | 0.0003 | -0.0004 | 0.946 | 0.86 | 0.846 | 0.001 | 0.002 | 0.001 |
| Tx $=1 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0 | -0.0001 | -0.0001 | 0.964 | 0.952 | 0.945 | 0.001 | 0.001 | 0.001 |
| Tx $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0003 | 0.0003 | 0.0002 | 0.942 | 0.956 | 0.97 | 0.001 | 0.001 | 0.001 |
| Tx $=1 ; \rho=0.81 ; ~ S S=100 ; ~ S S R=2 ; ~ T 2=0$ | -0.0003 | -0.0004 | -0.0004 | 0.942 | 0.97 | 0.998 | 0 | 0 | 0 |
| TX = 1; $\rho=0.00 ;$ SS = 100; SSR =2; $22=.1$ | -0.003 | -0.0031 | $-0.0026$ | 0.654 | 0.521 | 0.492 | 0.007 | 0.007 | 0.007 |
| Tx = 1; $\rho=0.40 ;$ SS = $100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.1$ | -0.0029 | -0.0027 | -0.0025 | 0.559 | 0.536 | 0.526 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=.1$ | 0.0022 | 0.0023 | 0.0021 | 0.461 | 0.482 | 0.513 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0006 | -0.0009 | -0.0003 | 0.33 | 0.378 | 0.524 | 0.005 | 0.007 | 0.005 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0023 | 0.002 | 0.0023 | 0.365 | 0.289 | 0.261 | 0.028 | 0.03 | 0.028 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0046 | -0.0056 | -0.0048 | 0.297 | 0.286 | 0.278 | 0.025 | 0.025 | 0.024 |
| Tx = 1; $\rho=0.59 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=.5$ | 0.0004 | 0.001 | 0.0008 | 0.235 | 0.253 | 0.263 | 0.024 | 0.024 | 0.024 |
| Tx = 1; $\rho=0.81 ;$ SS = $100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0046$ | -0.0045 | -0.0041 | 0.165 | 0.197 | 0.28 | 0.026 | 0.03 | 0.026 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0021 | -0.0018 | -0.0016 | 0.941 | 0.854 | 0.822 | 0.014 | 0.015 | 0.013 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0041 | -0.0034 | -0.0033 | 0.944 | 0.921 | 0.923 | 0.008 | 0.008 | 0.008 |
| TX $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0033 | 0.0029 | 0.0036 | 0.928 | 0.948 | 0.958 | 0.006 | 0.006 | 0.006 |
| TX $=0 ; \rho=0.81 ;$ SS =20; SSR $=1 ; ~ \mathrm{~T} 2=0$ | $-0.0013$ | -0.0008 | -0.0005 | 0.94 | 0.972 | 0.997 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | $-0.0065$ | -0.0033 | -0.0061 | 0.891 | 0.81 | 0.748 | 0.018 | 0.02 | 0.018 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0012 | 0.0023 | 0.0022 | 0.824 | 0.808 | 0.799 | 0.015 | 0.015 | 0.015 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | $-0.0027$ | -0.002 | -0.0028 | 0.819 | 0.842 | 0.869 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.81 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.003 | -0.0028 | -0.0042 | 0.744 | 0.784 | 0.907 | 0.008 | 0.01 | 0.008 |


| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0002 | 0.0033 | 0.0007 | 0.717 | 0.604 | 0.585 | 0.039 | 0.042 | 0.039 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0053 | -0.0051 | -0.0052 | 0.633 | 0.611 | 0.597 | 0.035 | 0.035 | 0.034 |
| Tx $=0 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0021 | 0.0002 | -0.0001 | 0.553 | 0.567 | 0.593 | 0.033 | 0.034 | 0.033 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=.5$ | 0.001 | -0.0079 | -0.0001 | 0.427 | 0.458 | 0.627 | 0.031 | 0.036 | 0.03 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | $-0.0024$ | -0.003 | -0.0025 | 0.943 | 0.864 | 0.832 | 0.009 | 0.01 | 0.009 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0024 | 0.0022 | 0.0024 | 0.942 | 0.936 | 0.924 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0009 | $-0.0006$ | -0.0006 | 0.942 | 0.944 | 0.96 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | -0.002 | -0.0015 | -0.0022 | 0.941 | 0.969 | 0.999 | 0.002 | 0.002 | 0.002 |
| TX $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0008 | -0.0007 | 0.0011 | 0.878 | 0.794 | 0.742 | 0.014 | 0.014 | 0.013 |
| TX $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0014 | -0.0025 | -0.0028 | 0.822 | 0.82 | 0.796 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0001 | 0.0005 | 0.0008 | 0.755 | 0.783 | 0.817 | 0.01 | 0.01 | 0.009 |
| TX $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0063 | 0.0056 | 0.0064 | 0.663 | 0.695 | 0.849 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.002 | 0.0033 | 0.0022 | 0.683 | 0.567 | 0.524 | 0.033 | 0.035 | 0.032 |
| TX $=0 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0067$ | $-0.0061$ | -0.0054 | 0.593 | 0.565 | 0.539 | 0.031 | 0.031 | 0.031 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0083 | 0.0091 | 0.0099 | 0.483 | 0.507 | 0.545 | 0.033 | 0.034 | 0.033 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0073 | 0.0053 | 0.0074 | 0.367 | 0.423 | 0.557 | 0.026 | 0.032 | 0.026 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; ~ S S R=1 ; ~ T 2=0$ | $-0.0022$ | -0.0023 | -0.0021 | 0.946 | 0.889 | 0.853 | 0.005 | 0.005 | 0.005 |
| TX $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | $-0.0003$ | $-0.0006$ | -0.0004 | 0.949 | 0.938 | 0.932 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; ~ S S R=1 ; ~ T 2=0$ | 0.0026 | 0.0024 | 0.0023 | 0.928 | 0.939 | 0.95 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=0$ | 0.0012 | 0.0011 | 0.0011 | 0.94 | 0.971 | 0.995 | 0.001 | 0.001 | 0.001 |
| TX $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0044 | 0.0057 | 0.0048 | 0.826 | 0.715 | 0.658 | 0.011 | 0.011 | 0.011 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.1$ | $-0.0036$ | $-0.0033$ | $-0.0035$ | 0.747 | 0.728 | 0.722 | 0.009 | 0.008 | 0.008 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T}=.1$ | 0.0001 | 0.0005 | -0.0005 | 0.703 | 0.723 | 0.763 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.1$ | $-0.0017$ | $-0.0023$ | -0.0017 | 0.567 | 0.614 | 0.78 | 0.007 | 0.008 | 0.007 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0014 | -0.0011 | 0.0005 | 0.577 | 0.47 | 0.438 | 0.031 | 0.034 | 0.03 |
| Tx $=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0014 | -0.0009 | 0.0002 | 0.462 | 0.464 | 0.446 | 0.031 | 0.031 | 0.031 |
| TX $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0125 | 0.0132 | 0.0142 | 0.406 | 0.435 | 0.442 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=1 ; ~ \mathrm{~T} 2=.5$ | $-0.0012$ | -0.003 | -0.0015 | 0.313 | 0.357 | 0.473 | 0.025 | 0.029 | 0.025 |
|  | 0.0008 | 0.0001 | 0.0006 | 0.949 | 0.878 | 0.845 | 0.003 | 0.004 | 0.003 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0006 | 0.0007 | 0.0006 | 0.954 | 0.935 | 0.925 | 0.002 | 0.002 | 0.002 |


| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0004 | 0.0004 | 0.0003 | 0.957 | 0.964 | 0.973 | 0.001 | 0.001 | 0.001 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0003 | 0.0002 | -0.0003 | 0.941 | 0.962 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0014 | 0.0017 | 0.0012 | 0.8 | 0.68 | 0.648 | 0.008 | 0.009 | 0.008 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0001 | 0.0004 | 0.0003 | 0.707 | 0.694 | 0.668 | 0.008 | 0.008 | 0.007 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0005 | -0.001 | -0.0008 | 0.639 | 0.651 | 0.685 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | 0 | 0 | -0.0002 | 0.495 | 0.541 | 0.705 | 0.006 | 0.007 | 0.006 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.007 | 0.0083 | 0.0069 | 0.472 | 0.404 | 0.375 | 0.031 | 0.034 | 0.031 |
| $T \mathrm{~T}=0 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.017 | 0.016 | 0.0173 | 0.38 | 0.359 | 0.355 | 0.028 | 0.028 | 0.029 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0107 | 0.0101 | 0.0099 | 0.372 | 0.384 | 0.401 | 0.026 | 0.027 | 0.026 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0026 | 0.0025 | 0.0018 | 0.232 | 0.266 | 0.362 | 0.026 | 0.03 | 0.026 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0002 | 0.0004 | -0.0001 | 0.937 | 0.87 | 0.847 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0006 | 0.0006 | 0.0009 | 0.951 | 0.941 | 0.928 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0016 | 0.0014 | 0.0015 | 0.936 | 0.946 | 0.963 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0008 | -0.0006 | $-0.0007$ | 0.944 | 0.971 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ; ~ S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.005 | -0.0054 | -0.0051 | 0.726 | 0.599 | 0.555 | 0.008 | 0.009 | 0.008 |
| Tx = 0; $\rho=0.40 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0045 | -0.0045 | -0.0043 | 0.652 | 0.637 | 0.631 | 0.007 | 0.006 | 0.006 |
| Tx = 0; $\rho=0.59 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | $-0.0016$ | -0.0014 | -0.0015 | 0.608 | 0.622 | 0.642 | 0.006 | 0.006 | 0.006 |
| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=.1$ | 0 | 0.0009 | 0.0001 | 0.471 | 0.511 | 0.651 | 0.005 | 0.006 | 0.005 |
| Tx $=0 ; \rho=0.00 ; ~ S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0039 | 0.0061 | 0.004 | 0.449 | 0.378 | 0.343 | 0.029 | 0.03 | 0.029 |
| Tx = 0; $\rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | $-0.0046$ | -0.0046 | -0.0047 | 0.344 | 0.34 | 0.327 | 0.027 | 0.027 | 0.027 |
| Tx = 0; $\rho=0.59 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0006 | 0.0006 | 0.0006 | 0.334 | 0.325 | 0.34 | 0.028 | 0.028 | 0.027 |
| TX $=0 ; \rho=0.81 ;$ SS $=100 ; S S R=1 ; ~ \mathrm{~T} 2=.5$ | 0.0022 | 0.0004 | 0.0021 | 0.251 | 0.255 | 0.375 | 0.025 | 0.029 | 0.025 |
| Tx $=0 ; \rho=0.00 ; ~ S S=100 ; ~ S S R=2 ; ~ T 2=0$ | 0.0017 | 0.0019 | 0.0017 | 0.95 | 0.872 | 0.832 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.40 ; ~ S S=100 ; S S R=2 ; ~ T 2=0$ | 0 | -0.0002 | -0.0001 | 0.949 | 0.937 | 0.936 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0009 | 0.0008 | 0.0009 | 0.937 | 0.948 | 0.964 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=0$ | -0.0001 | -0.001 | -0.0001 | 0.945 | 0.958 | 0.999 | 0 | 0 | 0 |
| Tx = 0; $\rho=0.00 ;$ SS = $100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.1$ | -0.0017 | -0.0034 | $-0.0015$ | 0.668 | 0.555 | 0.524 | 0.007 | 0.008 | 0.007 |
| Tx $=0 ; \rho=0.40 ; ~ S S=100 ; S S R=2 ; ~ T 2=.1$ | $-0.0037$ | -0.0033 | -0.0037 | 0.585 | 0.568 | 0.562 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~$ 2 $2=.1$ | 0.0003 | 0.0003 | 0.0006 | 0.515 | 0.532 | 0.552 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=.1$ | $-0.0032$ | -0.0017 | -0.0031 | 0.375 | 0.422 | 0.555 | 0.006 | 0.007 | 0.006 |


| Tx = 0; $\rho=0.00 ;$ SS = 100; SSR =2; $22=.5$ | $-0.0024$ | -0.0026 | $-0.0024$ | 0.366 | 0.294 | 0.275 | 0.026 | 0.029 | 0.026 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=0 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.002 | -0.002 | -0.0022 | 0.327 | 0.326 | 0.311 | 0.025 | 0.025 | 0.025 |
| TX $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | -0.0104 | -0.01 | -0.0108 | 0.258 | 0.267 | 0.278 | 0.028 | 0.028 | 0.028 |
| Tx = 0; $\rho=0.81 ;$ SS = 100; SSR = 2; $22=.5$ | 0.0077 | 0.0052 | 0.0074 | 0.2 | 0.219 | 0.293 | 0.027 | 0.031 | 0.026 |
| TX $=.1 ; \rho=0.00 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0033 | 0.0035 | 0.004 | 0.934 | 0.869 | 0.838 | 0.013 | 0.014 | 0.013 |
| TX $=.1 ; \rho=0.40 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0045 | -0.0051 | -0.0049 | 0.938 | 0.934 | 0.92 | 0.008 | 0.008 | 0.008 |
| TX $=.1 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; \mathrm{T} 2=0$ | -0.0011 | -0.0015 | -0.0018 | 0.939 | 0.947 | 0.961 | 0.006 | 0.006 | 0.005 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0006 | 0.001 | 0.0001 | 0.937 | 0.964 | 0.996 | 0.003 | 0.003 | 0.003 |
| Tx = . $1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0006 | -0.0033 | 0.0009 | 0.903 | 0.813 | 0.766 | 0.017 | 0.019 | 0.017 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0057 | 0.0056 | 0.0063 | 0.83 | 0.818 | 0.816 | 0.014 | 0.014 | 0.014 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0053 | 0.0058 | 0.0058 | 0.832 | 0.862 | 0.882 | 0.011 | 0.01 | 0.01 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0002 | -0.0025 | 0.0008 | 0.719 | 0.785 | 0.911 | 0.009 | 0.009 | 0.008 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0032 | -0.0055 | -0.0027 | 0.736 | 0.628 | 0.579 | 0.038 | 0.04 | 0.036 |
| Tx = $1 ; 1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0038 | -0.0036 | -0.0024 | 0.614 | 0.607 | 0.572 | 0.037 | 0.037 | 0.037 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0011 | 0.0008 | 0.0006 | 0.571 | 0.588 | 0.606 | 0.032 | 0.032 | 0.032 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0004 | -0.0016 | 0.0001 | 0.441 | 0.485 | 0.63 | 0.03 | 0.034 | 0.029 |
| Tx $=.1 ; \rho=0.00 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0036 | 0.001 | 0.0031 | 0.931 | 0.867 | 0.824 | 0.01 | 0.01 | 0.009 |
| Tx $=.1 ; \rho=0.40 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0011 | -0.0005 | -0.001 | 0.949 | 0.951 | 0.939 | 0.005 | 0.005 | 0.005 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.004 | 0.004 | 0.0044 | 0.938 | 0.95 | 0.967 | 0.004 | 0.004 | 0.004 |
| Tx $=.1 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0007 | 0.0001 | 0.0002 | 0.937 | 0.956 | 0.992 | 0.002 | 0.002 | 0.002 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0006$ | -0.0036 | -0.0009 | 0.866 | 0.778 | 0.738 | 0.014 | 0.015 | 0.014 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0024 | -0.0027 | -0.0028 | 0.819 | 0.805 | 0.785 | 0.012 | 0.012 | 0.012 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0074 | 0.0077 | 0.0074 | 0.791 | 0.809 | 0.841 | 0.009 | 0.009 | 0.009 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0053 | 0.0065 | 0.0046 | 0.659 | 0.717 | 0.868 | 0.008 | 0.009 | 0.007 |
| Tx = $1 ; 1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0007 | 0.0003 | -0.0009 | 0.675 | 0.57 | 0.535 | 0.034 | 0.037 | 0.033 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0053 | 0.0066 | 0.0072 | 0.579 | 0.557 | 0.56 | 0.03 | 0.031 | 0.03 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0055 | -0.006 | $-0.0067$ | 0.481 | 0.519 | 0.536 | 0.031 | 0.031 | 0.031 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0038 | 0.0034 | 0.0049 | 0.382 | 0.411 | 0.543 | 0.029 | 0.035 | 0.029 |
| Tx = .1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0014 | 0.0022 | 0.001 | 0.95 | 0.894 | 0.848 | 0.005 | 0.005 | 0.005 |
| Tx $=.1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0001 | 0 | -0.0002 | 0.952 | 0.94 | 0.936 | 0.003 | 0.003 | 0.003 |


| Tx $=.1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0014 | -0.0015 | $-0.0015$ | 0.945 | 0.952 | 0.963 | 0.002 | 0.002 | 0.002 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.81 ; ~ S S=50 ;$ SSR $=1 ; ~ T 2=0$ | 0.002 | 0.0017 | 0.002 | 0.952 | 0.965 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0008 | -0.0008 | -0.0006 | 0.81 | 0.687 | 0.654 | 0.011 | 0.012 | 0.011 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0041 | -0.0041 | -0.004 | 0.758 | 0.749 | 0.728 | 0.008 | 0.008 | 0.008 |
| $\mathrm{TX}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0047 | -0.0052 | -0.0046 | 0.709 | 0.739 | 0.748 | 0.007 | 0.007 | 0.007 |
| $\mathrm{TX}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0013 | 0.0006 | -0.001 | 0.581 | 0.647 | 0.796 | 0.006 | 0.007 | 0.006 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0017 | 0.0047 | 0.0017 | 0.573 | 0.472 | 0.426 | 0.03 | 0.032 | 0.029 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0097 | -0.0098 | -0.0091 | 0.449 | 0.434 | 0.424 | 0.03 | 0.03 | 0.03 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0115 | -0.0114 | -0.0119 | 0.397 | 0.416 | 0.44 | 0.029 | 0.029 | 0.029 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0055 | -0.0081 | -0.005 | 0.31 | 0.308 | 0.437 | 0.027 | 0.033 | 0.027 |
| Tx $=.1 ; \rho=0.00 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0011 | -0.002 | $-0.0013$ | 0.948 | 0.887 | 0.849 | 0.004 | 0.004 | 0.004 |
| Tx $=.1 ; \rho=0.40 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0006 | -0.0006 | $-0.0005$ | 0.959 | 0.951 | 0.939 | 0.002 | 0.002 | 0.002 |
| Tx $=.1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.001 | 0.001 | 0.0012 | 0.955 | 0.966 | 0.974 | 0.001 | 0.001 | 0.001 |
| Tx $=.1 ; \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0005 | -0.0006 | -0.0005 | 0.948 | 0.974 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0017 | -0.0007 | -0.0014 | 0.791 | 0.684 | 0.641 | 0.008 | 0.009 | 0.008 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0006 | -0.0008 | $-0.0008$ | 0.71 | 0.695 | 0.686 | 0.007 | 0.007 | 0.007 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.002 | -0.0018 | $-0.0023$ | 0.671 | 0.702 | 0.724 | 0.006 | 0.006 | 0.006 |
| Tx $=.1 ; \rho=0.81 ;$ SS = 50; SSR $=2 ; ~ \mathrm{~T} 2=.1$ | 0.0021 | 0.0002 | 0.0024 | 0.515 | 0.546 | 0.721 | 0.006 | 0.007 | 0.006 |
| Tx $=.1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0069 | -0.0048 | -0.0069 | 0.483 | 0.358 | 0.359 | 0.031 | 0.034 | 0.031 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0066 | $-0.0065$ | -0.0068 | 0.417 | 0.395 | 0.389 | 0.026 | 0.026 | 0.026 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0052 | -0.0056 | -0.0049 | 0.365 | 0.374 | 0.391 | 0.025 | 0.026 | 0.026 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0019 | -0.0047 | -0.0017 | 0.261 | 0.285 | 0.379 | 0.026 | 0.03 | 0.026 |
| Tx = .1; $\rho=0.00 ; S S=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0031 | -0.0028 | -0.0032 | 0.955 | 0.869 | 0.83 | 0.003 | 0.003 | 0.003 |
| $T x=.1 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0021 | 0.0022 | 0.0023 | 0.929 | 0.915 | 0.909 | 0.002 | 0.002 | 0.002 |
| $T x=.1 ; \rho=0.59 ; S S=100 ; ~ S S R=1 ; ~ T 2=0$ | 0.0014 | 0.0014 | 0.0014 | 0.947 | 0.96 | 0.968 | 0.001 | 0.001 | 0.001 |
| Tx = . $1 ; \rho=0.81 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.001 | 0.0014 | 0.0011 | 0.931 | 0.955 | 0.994 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.00 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0073 | -0.0067 | -0.0071 | 0.732 | 0.608 | 0.579 | 0.008 | 0.009 | 0.008 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0041 | -0.0039 | -0.0043 | 0.662 | 0.649 | 0.621 | 0.007 | 0.007 | 0.007 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0007 | -0.0008 | -0.001 | 0.609 | 0.619 | 0.649 | 0.006 | 0.006 | 0.006 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0054 | -0.0053 | -0.0054 | 0.455 | 0.484 | 0.635 | 0.006 | 0.007 | 0.006 |


| TX = .1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T}=.5$ | -0.0047 | -0.0049 | -0.005 | 0.429 | 0.354 | 0.325 | 0.028 | 0.031 | 0.028 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0039 | 0.0033 | 0.0028 | 0.335 | 0.32 | 0.307 | 0.028 | 0.028 | 0.028 |
| $\mathrm{TX}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0035 | -0.0037 | -0.0032 | 0.295 | 0.308 | 0.324 | 0.025 | 0.025 | 0.025 |
| $\mathrm{T} x=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0084 | -0.0101 | -0.009 | 0.225 | 0.243 | 0.342 | 0.025 | 0.03 | 0.026 |
| TX = .1; $\rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.0009 | -0.0002 | $-0.0009$ | 0.953 | 0.868 | 0.829 | 0.002 | 0.002 | 0.002 |
| $\mathrm{T}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0009 | $-0.0006$ | -0.0008 | 0.946 | 0.931 | 0.923 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0006 | 0.0006 | 0.0005 | 0.95 | 0.959 | 0.969 | 0.001 | 0.001 | 0.001 |
| TX = . $1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=0$ | -0.0001 | -0.0003 | -0.0001 | 0.954 | 0.977 | 0.998 | 0 | 0 | 0 |
| Tx = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0002 | 0.0011 | 0.0003 | 0.693 | 0.587 | 0.542 | 0.006 | 0.007 | 0.006 |
| Tx = .1; $\rho=0.40 ;$ SS =100; SSR $=2 ; \mathrm{T} 2=.1$ | 0.0009 | 0.001 | 0.0012 | 0.571 | 0.56 | 0.547 | 0.006 | 0.006 | 0.006 |
| TX = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0022 | -0.002 | -0.002 | 0.536 | 0.551 | 0.589 | 0.006 | 0.006 | 0.006 |
| TX = .1; $\rho=0.81 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=.1$ | -0.001 | 0.0001 | $-0.0009$ | 0.379 | 0.404 | 0.566 | 0.005 | 0.006 | 0.005 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0044 | -0.0011 | -0.0041 | 0.389 | 0.299 | 0.295 | 0.026 | 0.028 | 0.026 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0012 | -0.0016 | -0.002 | 0.286 | 0.273 | 0.278 | 0.025 | 0.025 | 0.024 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0065 | -0.0061 | -0.007 | 0.285 | 0.297 | 0.307 | 0.027 | 0.027 | 0.027 |
| Tx = .1; $\rho=0.81 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=.5$ | -0.0012 | -0.0025 | $-0.0017$ | 0.18 | 0.194 | 0.274 | 0.028 | 0.032 | 0.027 |
| Tx $=.5 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.005 | -0.0047 | -0.0049 | 0.936 | 0.87 | 0.836 | 0.014 | 0.015 | 0.013 |
| Tx $=.5 ; \rho=0.40 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0007 | 0.0013 | 0.0015 | 0.937 | 0.924 | 0.919 | 0.008 | 0.008 | 0.008 |
| Tx $=.5 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0023 | 0.0031 | 0.0027 | 0.931 | 0.941 | 0.957 | 0.006 | 0.006 | 0.006 |
| Tx $=.5 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0003 | 0.0001 | -0.0002 | 0.938 | 0.968 | 0.997 | 0.003 | 0.003 | 0.003 |
| TX $=.5 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0018 | -0.0028 | $-0.0017$ | 0.876 | 0.813 | 0.766 | 0.018 | 0.02 | 0.018 |
| TX $=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0022 | -0.002 | $-0.0017$ | 0.856 | 0.824 | 0.806 | 0.013 | 0.013 | 0.013 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0046 | 0.0045 | 0.0051 | 0.818 | 0.835 | 0.859 | 0.011 | 0.011 | 0.011 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0006 | 0.003 | 0.0002 | 0.727 | 0.777 | 0.922 | 0.008 | 0.009 | 0.008 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0168 | 0.0143 | 0.0158 | 0.69 | 0.595 | 0.556 | 0.04 | 0.043 | 0.039 |
| Tx $=.5 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ \mathrm{~T} 2=.5$ | -0.0023 | $-0.0036$ | -0.0033 | 0.639 | 0.629 | 0.613 | 0.034 | 0.034 | 0.033 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0017 | 0.001 | -0.0011 | 0.589 | 0.609 | 0.631 | 0.03 | 0.03 | 0.03 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.006 | 0.0119 | 0.0075 | 0.421 | 0.485 | 0.645 | 0.029 | 0.033 | 0.028 |
| Tx $=.5 ; \rho=0.00 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0044 | -0.0043 | -0.0041 | 0.95 | 0.884 | 0.854 | 0.008 | 0.009 | 0.008 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0038 | -0.0038 | -0.0037 | 0.934 | 0.932 | 0.926 | 0.005 | 0.005 | 0.005 |


| Tx $=.5 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0016 | 0.0021 | 0.0016 | 0.94 | 0.95 | 0.963 | 0.004 | 0.004 | 0.004 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .5; $\rho=0.81 ;$ SS =20; SSR $=2 ; \mathrm{T} 2=0$ | -0.001 | -0.0013 | -0.0015 | 0.933 | 0.947 | 0.994 | 0.002 | 0.003 | 0.002 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0006 | 0.0006 | 0.0004 | 0.87 | 0.784 | 0.737 | 0.014 | 0.015 | 0.014 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0033$ | -0.0029 | -0.0032 | 0.819 | 0.805 | 0.8 | 0.011 | 0.01 | 0.01 |
| $\mathrm{TX}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0013 | -0.0017 | -0.0018 | 0.784 | 0.81 | 0.835 | 0.009 | 0.009 | 0.009 |
| $\mathrm{TX}=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0038 | -0.0037 | -0.0035 | 0.653 | 0.712 | 0.859 | 0.008 | 0.008 | 0.008 |
| $\mathrm{TX}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0014 | -0.0026 | -0.002 | 0.667 | 0.565 | 0.54 | 0.034 | 0.037 | 0.033 |
| $\mathrm{TX}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0019 | 0.0028 | 0.0029 | 0.576 | 0.568 | 0.571 | 0.03 | 0.029 | 0.029 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0 | -0.0007 | -0.0003 | 0.528 | 0.538 | 0.568 | 0.029 | 0.03 | 0.029 |
| Tx = . $5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.003 | 0.0023 | 0.0047 | 0.372 | 0.441 | 0.583 | 0.027 | 0.032 | 0.026 |
| Tx = . $5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0002 | $-0.0004$ | 0 | 0.962 | 0.885 | 0.85 | 0.005 | 0.005 | 0.005 |
| Tx = . $5 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0 | 0.0002 | 0.0003 | 0.946 | 0.931 | 0.918 | 0.003 | 0.003 | 0.003 |
| Tx = . $5 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0009 | 0.0014 | 0.0012 | 0.95 | 0.959 | 0.971 | 0.002 | 0.002 | 0.002 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=0$ | $-0.0006$ | -0.0009 | -0.0006 | 0.949 | 0.955 | 0.997 | 0.001 | 0.001 | 0.001 |
| Tx = . $5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0037 | 0.0033 | 0.0034 | 0.824 | 0.712 | 0.673 | 0.01 | 0.011 | 0.01 |
| Tx = . $5 ; \rho=0.40 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0013 | 0.0019 | 0.0014 | 0.763 | 0.742 | 0.723 | 0.008 | 0.008 | 0.008 |
| Tx = . $5 ; \rho=0.59 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0014 | 0.001 | 0.0012 | 0.678 | 0.703 | 0.736 | 0.008 | 0.008 | 0.008 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.002 | -0.0024 | -0.0014 | 0.542 | 0.612 | 0.778 | 0.007 | 0.007 | 0.007 |
| Tx = . $5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0121 | 0.0137 | 0.0117 | 0.579 | 0.484 | 0.455 | 0.028 | 0.031 | 0.028 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0025$ | -0.0028 | -0.0026 | 0.473 | 0.44 | 0.438 | 0.029 | 0.029 | 0.029 |
| Tx = . $5 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0012 | 0.002 | 0.0004 | 0.413 | 0.43 | 0.449 | 0.028 | 0.028 | 0.028 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=.5$ | $-0.0023$ | -0.0024 | -0.0023 | 0.328 | 0.304 | 0.472 | 0.026 | 0.03 | 0.026 |
| Tx = . $5 ; \rho=0.00 ; S S=50 ;$ SSR $=2 ; ~ \mathrm{~T} 2=0$ | 0.0035 | 0.0035 | 0.0035 | 0.942 | 0.862 | 0.819 | 0.004 | 0.004 | 0.004 |
| Tx = . $5 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0022 | 0.0022 | 0.0023 | 0.937 | 0.921 | 0.916 | 0.002 | 0.002 | 0.002 |
| Tx = . $5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0 | -0.0002 | -0.0002 | 0.952 | 0.962 | 0.967 | 0.001 | 0.002 | 0.001 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | $-0.0002$ | 0.0001 | -0.0003 | 0.938 | 0.954 | 0.996 | 0.001 | 0.001 | 0.001 |
| Tx = . $5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.002 | 0.0017 | 0.0019 | 0.785 | 0.702 | 0.626 | 0.008 | 0.009 | 0.008 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.003 | $-0.0027$ | -0.003 | 0.708 | 0.692 | 0.659 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0051$ | -0.0045 | -0.0049 | 0.645 | 0.665 | 0.689 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0015 | 0.0024 | 0.0016 | 0.524 | 0.577 | 0.721 | 0.006 | 0.007 | 0.006 |


| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0078 | 0.0074 | 0.0075 | 0.475 | 0.41 | 0.344 | 0.03 | 0.032 | 0.029 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0028 | 0.0027 | 0.0029 | 0.452 | 0.454 | 0.435 | 0.024 | 0.024 | 0.024 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0028 | -0.0033 | $-0.0033$ | 0.379 | 0.391 | 0.41 | 0.027 | 0.027 | 0.026 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0032 | -0.0038 | $-0.0036$ | 0.272 | 0.297 | 0.386 | 0.025 | 0.029 | 0.025 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.002 | -0.0016 | -0.0019 | 0.94 | 0.87 | 0.823 | 0.003 | 0.003 | 0.003 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0017 | 0.0016 | 0.0016 | 0.946 | 0.935 | 0.928 | 0.002 | 0.002 | 0.002 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0004 | 0.0005 | 0.0004 | 0.949 | 0.96 | 0.975 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0004 | -0.0004 | -0.0004 | 0.954 | 0.963 | 0.99 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0018 | -0.0018 | -0.0019 | 0.743 | 0.652 | 0.591 | 0.007 | 0.008 | 0.007 |
| $T \mathrm{X}=.5 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0018 | -0.0018 | -0.0022 | 0.659 | 0.63 | 0.611 | 0.007 | 0.007 | 0.007 |
| TX = .5; $\rho=0.59 ;$ SS = 100; SSR $=1 ; \mathrm{T} 2=.1$ | 0.0014 | 0.002 | 0.0017 | 0.593 | 0.607 | 0.633 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0048 | 0.004 | 0.0051 | 0.44 | 0.478 | 0.639 | 0.006 | 0.007 | 0.006 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | 0.0046 | 0.0023 | 0.0044 | 0.476 | 0.385 | 0.338 | 0.026 | 0.028 | 0.025 |
| $T \mathrm{X}=.5 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0002 | 0.0014 | 0.0008 | 0.337 | 0.317 | 0.319 | 0.029 | 0.029 | 0.029 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | 0.0106 | 0.0111 | 0.0108 | 0.316 | 0.326 | 0.338 | 0.027 | 0.028 | 0.027 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0015 | -0.0024 | 0.0019 | 0.22 | 0.252 | 0.333 | 0.024 | 0.028 | 0.024 |
| TX = . $; ~ \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.0029 | -0.003 | -0.0029 | 0.941 | 0.864 | 0.834 | 0.002 | 0.002 | 0.002 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; S S R=2 ; \mathrm{T}_{2}=0$ | 0.0009 | 0.0007 | 0.0009 | 0.938 | 0.921 | 0.915 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0011 | -0.001 | -0.0012 | 0.948 | 0.952 | 0.965 | 0.001 | 0.001 | 0.001 |
| TX = . $; ~ \rho=0.81 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=0$ | -0.0009 | -0.001 | -0.0009 | 0.946 | 0.974 | 0.998 | 0 | 0 | 0 |
| TX = . $; ~ \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ \mathrm{r} 2=.1$ | 0.0012 | 0.0012 | 0.0013 | 0.675 | 0.561 | 0.535 | 0.007 | 0.008 | 0.007 |
| $T \mathrm{X}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{r} 2=.1$ | -0.0028 | -0.0029 | -0.0029 | 0.591 | 0.573 | 0.549 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0016 | -0.0016 | -0.0015 | 0.538 | 0.553 | 0.576 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}^{2}=.1$ | -0.0068 | -0.0057 | $-0.0064$ | 0.417 | 0.43 | 0.59 | 0.005 | 0.006 | 0.005 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0081 | -0.0112 | -0.0077 | 0.401 | 0.318 | 0.285 | 0.026 | 0.03 | 0.026 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0003 | -0.0008 | 0.0001 | 0.299 | 0.288 | 0.281 | 0.024 | 0.024 | 0.024 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0034 | 0.0027 | 0.0036 | 0.26 | 0.267 | 0.283 | 0.025 | 0.025 | 0.025 |
| $T \mathrm{X}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.005 | -0.007 | -0.005 | 0.181 | 0.2 | 0.294 | 0.024 | 0.029 | 0.024 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0077 | 0.0081 | 0.0075 | 0.941 | 0.868 | 0.826 | 0.013 | 0.014 | 0.013 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0034 | 0.0026 | 0.0033 | 0.938 | 0.929 | 0.924 | 0.008 | 0.008 | 0.008 |


| TX $=1 ; \rho=0.59 ; S S=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0032 | 0.0026 | 0.0026 | 0.95 | 0.954 | 0.964 | 0.005 | 0.005 | 0.005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.81 ;$ SS =20; SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0005 | 0.001 | -0.0001 | 0.938 | 0.957 | 0.995 | 0.003 | 0.003 | 0.003 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0013 | 0.0037 | 0.0018 | 0.872 | 0.779 | 0.738 | 0.02 | 0.021 | 0.019 |
| Tx = 1; $\rho=0.40 ;$ SS =20; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | $-0.0038$ | -0.0036 | -0.0028 | 0.858 | 0.847 | 0.839 | 0.013 | 0.013 | 0.013 |
| TX $=1 ; \rho=0.59 ; S S=20 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0039 | -0.0034 | -0.0044 | 0.831 | 0.837 | 0.862 | 0.011 | 0.011 | 0.011 |
| TX $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.002 | -0.0009 | -0.0017 | 0.723 | 0.782 | 0.921 | 0.008 | 0.009 | 0.008 |
| TX $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0043 | -0.0063 | -0.0069 | 0.741 | 0.607 | 0.58 | 0.039 | 0.041 | 0.038 |
| TX $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.003 | -0.0019 | -0.0026 | 0.627 | 0.62 | 0.61 | 0.032 | 0.032 | 0.031 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0071 | -0.0067 | $-0.0066$ | 0.543 | 0.571 | 0.603 | 0.032 | 0.032 | 0.032 |
| TX $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=.5$ | -0.0079 | -0.0068 | -0.0082 | 0.43 | 0.47 | 0.64 | 0.029 | 0.035 | 0.029 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0005 | 0.0007 | -0.0002 | 0.933 | 0.86 | 0.838 | 0.009 | 0.01 | 0.009 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0048 | 0.005 | 0.0049 | 0.935 | 0.928 | 0.92 | 0.006 | 0.006 | 0.006 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0012 | 0.001 | 0.0011 | 0.934 | 0.945 | 0.956 | 0.004 | 0.004 | 0.004 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | -0.0008 | -0.002 | -0.0004 | 0.942 | 0.963 | 0.996 | 0.002 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0063 | 0.0079 | 0.0062 | 0.865 | 0.766 | 0.737 | 0.015 | 0.016 | 0.014 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0034 | 0.0031 | 0.0029 | 0.846 | 0.836 | 0.799 | 0.01 | 0.01 | 0.01 |
| Tx $=1 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.1$ | 0.0005 | 0.0008 | 0 | 0.797 | 0.818 | 0.839 | 0.009 | 0.009 | 0.009 |
| Tx $=1 ; \rho=0.81 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | $-0.0037$ | -0.005 | -0.0029 | 0.678 | 0.718 | 0.853 | 0.007 | 0.009 | 0.007 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0 | -0.002 | -0.0002 | 0.65 | 0.544 | 0.519 | 0.034 | 0.038 | 0.033 |
| TX $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0012 | 0.0007 | 0.0005 | 0.542 | 0.516 | 0.515 | 0.032 | 0.032 | 0.032 |
| Tx $=1 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0015 | -0.0028 | -0.001 | 0.482 | 0.512 | 0.533 | 0.03 | 0.03 | 0.03 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=.5$ | -0.0013 | -0.0056 | -0.0045 | 0.368 | 0.427 | 0.54 | 0.03 | 0.034 | 0.03 |
| Tx $=1 ; \rho=0.00 ; S S=50 ;$ SSR $=1 ; ~$ 2 $2=0$ | $-0.0004$ | -0.0005 | -0.0003 | 0.926 | 0.851 | 0.811 | 0.006 | 0.006 | 0.006 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0034 | -0.0036 | -0.0038 | 0.95 | 0.942 | 0.935 | 0.003 | 0.003 | 0.003 |
| Tx $=1 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0028 | 0.0023 | 0.0025 | 0.947 | 0.956 | 0.967 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.81 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0001 | 0 | 0.0001 | 0.946 | 0.959 | 0.995 | 0.001 | 0.001 | 0.001 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0007 | 0.0009 | 0.0005 | 0.818 | 0.723 | 0.682 | 0.011 | 0.012 | 0.011 |
| Tx $=1 ; \rho=0.40 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.001 | -0.0011 | -0.0013 | 0.758 | 0.742 | 0.712 | 0.008 | 0.008 | 0.008 |
| TX $=1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0018 | -0.0017 | -0.0022 | 0.73 | 0.744 | 0.77 | 0.007 | 0.007 | 0.007 |
| Tx $=1 ; \rho=0.81 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0021 | -0.0013 | -0.0021 | 0.591 | 0.64 | 0.795 | 0.006 | 0.007 | 0.006 |


| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | $-0.0001$ | $-0.0011$ | -0.0008 | 0.539 | 0.464 | 0.419 | 0.033 | 0.036 | 0.033 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0026 | 0.0035 | 0.0041 | 0.474 | 0.461 | 0.44 | 0.028 | 0.028 | 0.028 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | -0.0054 | -0.0054 | -0.0052 | 0.414 | 0.44 | 0.453 | 0.027 | 0.027 | 0.027 |
| Tx $=1 ; \rho=0.81 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0032 | 0.0031 | 0.0034 | 0.329 | 0.334 | 0.468 | 0.027 | 0.032 | 0.027 |
| $\mathrm{Tx}=1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0017 | 0.0014 | 0.0018 | 0.943 | 0.87 | 0.835 | 0.004 | 0.004 | 0.004 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0006 | 0.0008 | 0.0004 | 0.948 | 0.938 | 0.934 | 0.002 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.59 ;$ SS =50; SSR $=2 ; \mathrm{T}^{2}=0$ | 0.0008 | 0.0005 | 0.0006 | 0.935 | 0.941 | 0.955 | 0.002 | 0.002 | 0.002 |
| TX $=1 ; \rho=0.81 ;$ SS =50; SSR $=2 ; \mathrm{T} 2=0$ | 0.0001 | 0 | 0 | 0.926 | 0.963 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.003 | 0.0025 | 0.0027 | 0.781 | 0.66 | 0.62 | 0.009 | 0.01 | 0.009 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0014 | 0.0021 | 0.002 | 0.721 | 0.694 | 0.675 | 0.007 | 0.007 | 0.007 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | $-0.0005$ | $-0.0005$ | -0.001 | 0.662 | 0.68 | 0.706 | 0.007 | 0.007 | 0.006 |
| Tx $=1 ; \rho=0.81 ;$ SS $=50 ; S S R=2 ; ~ T 2=.1$ | -0.0011 | -0.001 | -0.0008 | 0.491 | 0.554 | 0.72 | 0.006 | 0.007 | 0.006 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0039 | -0.0035 | -0.0038 | 0.495 | 0.403 | 0.382 | 0.03 | 0.032 | 0.03 |
| TX $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0009 | $-0.0009$ | -0.0007 | 0.415 | 0.404 | 0.381 | 0.027 | 0.027 | 0.027 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0043 | 0.0038 | 0.0039 | 0.357 | 0.366 | 0.382 | 0.027 | 0.028 | 0.027 |
| Tx $=1 ; \rho=0.81 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.004 | 0.0029 | 0.0043 | 0.249 | 0.286 | 0.401 | 0.025 | 0.03 | 0.025 |
| Tx $=1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | $-0.0015$ | $-0.0022$ | -0.0016 | 0.949 | 0.889 | 0.866 | 0.002 | 0.003 | 0.002 |
| Tx $=1 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.002 | $-0.0019$ | -0.002 | 0.952 | 0.951 | 0.939 | 0.001 | 0.001 | 0.001 |
| Tx $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0011 | $-0.0009$ | -0.001 | 0.95 | 0.959 | 0.968 | 0.001 | 0.001 | 0.001 |
| Tx $=1 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0007 | 0.0009 | 0.0008 | 0.941 | 0.967 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0044 | 0.0067 | 0.0046 | 0.748 | 0.635 | 0.605 | 0.008 | 0.008 | 0.008 |
| TX = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0016 | 0.0014 | 0.0017 | 0.664 | 0.64 | 0.629 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ;$ SS = $100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0012 | $-0.0012$ | -0.001 | 0.576 | 0.592 | 0.624 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.81 ;$ SS = $100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0011 | 0.0007 | 0.0015 | 0.455 | 0.499 | 0.655 | 0.006 | 0.007 | 0.006 |
| Tx = 1; $\rho=0.00 ;$ SS = $100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | $-0.0004$ | $-0.0003$ | -0.0002 | 0.425 | 0.365 | 0.319 | 0.029 | 0.032 | 0.029 |
| TX = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0013 | $-0.0008$ | -0.0018 | 0.35 | 0.342 | 0.322 | 0.029 | 0.029 | 0.029 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0095 | 0.0089 | 0.0096 | 0.306 | 0.325 | 0.34 | 0.027 | 0.028 | 0.028 |
| Tx = 1; $\rho=0.81 ;$ SS = $100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0065 | 0.0074 | 0.0069 | 0.217 | 0.255 | 0.34 | 0.025 | 0.029 | 0.025 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=0$ | -0.0001 | 0.0003 | -0.0002 | 0.949 | 0.861 | 0.826 | 0.002 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=0$ | $-0.0005$ | -0.0005 | -0.0004 | 0.957 | 0.946 | 0.94 | 0.001 | 0.001 | 0.001 |


| TX $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}_{2}=0$ | 0.0002 | 0.0003 | 0.0002 | 0.947 | 0.955 | 0.965 | 0.001 | 0.001 | 0.001 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.81 ;$ SS = 100; SSR $=2 ; \mathrm{T} 2=0$ | 0.0001 | 0.0002 | 0 | 0.947 | 0.965 | 0.999 | 0 | 0 | 0 |
| TX $=1 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | 0.0027 | 0.0018 | 0.0026 | 0.674 | 0.555 | 0.542 | 0.007 | 0.008 | 0.007 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0037 | 0.0039 | 0.0039 | 0.607 | 0.569 | 0.565 | 0.006 | 0.006 | 0.006 |
| Tx $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0011 | -0.0007 | -0.0012 | 0.531 | 0.547 | 0.574 | 0.006 | 0.006 | 0.006 |
| TX $=1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0036 | 0.0051 | 0.0037 | 0.39 | 0.454 | 0.573 | 0.005 | 0.006 | 0.005 |
| Tx $=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0008 | 0.0008 | 0.0006 | 0.384 | 0.309 | 0.276 | 0.027 | 0.03 | 0.027 |
| $T \mathrm{~T}=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0029 | 0.0032 | 0.0022 | 0.335 | 0.307 | 0.286 | 0.023 | 0.024 | 0.023 |
| TX $=1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0019 | 0.0008 | 0.0021 | 0.257 | 0.269 | 0.287 | 0.026 | 0.026 | 0.026 |
| $T \mathrm{~T}=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0009 | -0.0008 | 0.0017 | 0.175 | 0.192 | 0.268 | 0.026 | 0.032 | 0.026 |

Simulation results: $\mathbf{2 0}$ studies per meta-analysis, random effects

| Scenario | Bias, complete | Bias, 50\% incomplete | Bias, 100\% incomplete | Coverage probability, complete | Coverage probability, 50\% incomplete | Coverage probability, 100\% incomplete | MSE, complete | MSE, 50\% incomplete | MSE, 100\% incomplete |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0015 | 0.0003 | 0.001 | 0.955 | 0.939 | 0.938 | 0.01 | 0.01 | 0.01 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ \tau 2=0$ | -0.003 | -0.0033 | -0.0034 | 0.953 | 0.949 | 0.944 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0033 | -0.0034 | -0.0037 | 0.955 | 0.961 | 0.97 | 0.004 | 0.004 | 0.004 |
| Tx = 0; $\rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ \tau 2=0$ | -0.0009 | -0.0011 | -0.001 | 0.957 | 0.972 | 1 | 0.002 | 0.002 | 0.002 |
| TX = 0; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | -0.0022 | -0.0011 | -0.0015 | 0.939 | 0.939 | 0.935 | 0.015 | 0.014 | 0.014 |
| TX = 0; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.1$ | 0.0055 | 0.0055 | 0.0058 | 0.952 | 0.945 | 0.952 | 0.01 | 0.01 | 0.01 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0032 | 0.0028 | 0.0029 | 0.939 | 0.936 | 0.938 | 0.009 | 0.009 | 0.009 |
| TX = 0; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \tau 2=.1$ | -0.0001 | 0.0007 | -0.0002 | 0.921 | 0.913 | 0.921 | 0.007 | 0.008 | 0.008 |
| Tx = 0; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; ~ \tau 2=.5$ | 0.0055 | 0.0056 | 0.0055 | 0.922 | 0.921 | 0.919 | 0.037 | 0.037 | 0.036 |
| Tx $=0 ; \rho=0.40 ; ~ S S=20 ; S S R=1 ; ~ t 2=.5$ | -0.003 | -0.0036 | -0.0034 | 0.952 | 0.953 | 0.955 | 0.032 | 0.032 | 0.032 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0016 | -0.0016 | -0.0017 | 0.946 | 0.947 | 0.947 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ t 2=.5$ | -0.0027 | -0.0025 | -0.0026 | 0.929 | 0.933 | 0.93 | 0.028 | 0.028 | 0.028 |
| Tx $=0 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \tau 2=0$ | 0.0063 | 0.0065 | 0.0061 | 0.936 | 0.924 | 0.918 | 0.008 | 0.008 | 0.008 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0037 | -0.0039 | -0.0042 | 0.949 | 0.946 | 0.943 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ \tau 2=0$ | -0.0012 | -0.0012 | -0.0007 | 0.947 | 0.954 | 0.963 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ t 2=0$ | -0.0001 | 0.0011 | 0 | 0.965 | 0.968 | 0.997 | 0.001 | 0.002 | 0.001 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ t 2=.1$ | 0.0012 | 0.0021 | 0.0016 | 0.936 | 0.933 | 0.939 | 0.012 | 0.012 | 0.012 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0019 | -0.0019 | -0.0022 | 0.944 | 0.94 | 0.938 | 0.009 | 0.009 | 0.009 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ t 2=.1$ | -0.0034 | -0.0029 | -0.0034 | 0.931 | 0.931 | 0.925 | 0.009 | 0.009 | 0.009 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ 22=.1$ | 0.0006 | 0.0009 | 0.0005 | 0.948 | 0.948 | 0.946 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.00 ; ~ S S=20 ; S S R=2 ; ~ t 2=.5$ | 0.0055 | 0.0055 | 0.0057 | 0.937 | 0.94 | 0.937 | 0.03 | 0.03 | 0.03 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0097 | 0.0101 | 0.0102 | 0.936 | 0.937 | 0.936 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0083 | -0.0082 | -0.0085 | 0.948 | 0.947 | 0.95 | 0.027 | 0.027 | 0.027 |
| Tx $=0 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ t 2=.5$ | 0.0022 | 0.0024 | 0.0023 | 0.927 | 0.923 | 0.926 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.00 ; ~ S S=50 ; S S R=1 ; ~ \tau 2=0$ | 0.003 | 0.003 | 0.0029 | 0.957 | 0.934 | 0.937 | 0.004 | 0.004 | 0.004 |


| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0003 | 0.0002 | 0.0003 | 0.962 | 0.958 | 0.957 | 0.002 | 0.002 | 0.002 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | $-0.0018$ | -0.0019 | -0.0018 | 0.946 | 0.95 | 0.965 | 0.002 | 0.002 | 0.002 |
| TX $=0 ; \rho=0.81 ;$ SS $=50 ; S S R=1 ; ~ T 2=0$ | 0.0005 | 0.0007 | 0.0004 | 0.958 | 0.965 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0042 | 0.0042 | 0.0042 | 0.939 | 0.946 | 0.937 | 0.009 | 0.009 | 0.009 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0011 | 0.0012 | 0.0012 | 0.942 | 0.94 | 0.943 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0036 | 0.0034 | 0.0035 | 0.94 | 0.939 | 0.939 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0008 | 0.0009 | 0.0008 | 0.93 | 0.937 | 0.933 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.00 ;$ SS $=50 ; S S R=1 ; ~ T 2=.5$ | $-0.0043$ | -0.0041 | -0.0043 | 0.936 | 0.937 | 0.936 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ; S S R=1 ; ~ T 2=.5$ | 0.0025 | 0.0025 | 0.0026 | 0.931 | 0.934 | 0.931 | 0.028 | 0.028 | 0.028 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ; S S R=1 ; ~ T 2=.5$ | 0.0052 | 0.0052 | 0.0052 | 0.935 | 0.932 | 0.934 | 0.028 | 0.028 | 0.028 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ; S S R=1 ; ~ T 2=.5$ | 0.0004 | 0.0004 | 0.0004 | 0.925 | 0.92 | 0.924 | 0.025 | 0.025 | 0.025 |
| TX $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0004 | 0.0002 | 0.0007 | 0.953 | 0.927 | 0.939 | 0.003 | 0.003 | 0.003 |
| TX $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0023 | 0.0022 | 0.0021 | 0.954 | 0.952 | 0.947 | 0.002 | 0.002 | 0.002 |
| TX $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.002 | -0.0021 | -0.0021 | 0.954 | 0.96 | 0.971 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | $-0.0013$ | $-0.0006$ | -0.0011 | 0.958 | 0.97 | 0.997 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ;$ SS $=50 ; S S R=2 ; ~ T 2=.1$ | 0.0023 | 0.0018 | 0.0023 | 0.93 | 0.929 | 0.933 | 0.008 | 0.008 | 0.008 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ; S S R=2 ; ~ T 2=.1$ | -0.0003 | $-0.0002$ | -0.0003 | 0.943 | 0.942 | 0.944 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ; S S R=2 ; ~ T 2=.1$ | 0.0014 | 0.0015 | 0.0015 | 0.919 | 0.921 | 0.922 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0033 | 0.0037 | 0.0034 | 0.935 | 0.934 | 0.934 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.00 ;$ SS $=50 ; S S R=2 ; ~ T 2=.5$ | 0.0135 | 0.0136 | 0.0135 | 0.925 | 0.919 | 0.924 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ; S S R=2 ; ~ T 2=.5$ | 0.0052 | 0.0052 | 0.0052 | 0.939 | 0.941 | 0.937 | 0.028 | 0.028 | 0.028 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ; S S R=2 ; ~ T 2=.5$ | -0.002 | -0.0019 | -0.0019 | 0.929 | 0.926 | 0.924 | 0.027 | 0.027 | 0.027 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0117 | 0.0119 | 0.0117 | 0.936 | 0.936 | 0.935 | 0.026 | 0.026 | 0.026 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | $-0.0003$ | $-0.0005$ | -0.0002 | 0.964 | 0.947 | 0.951 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ; S S R=1 ; ~ T 2=0$ | -0.0001 | 0 | -0.0001 | 0.965 | 0.962 | 0.958 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T}_{2}=0$ | $-0.0003$ | -0.0002 | -0.0003 | 0.96 | 0.967 | 0.97 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0003 | $-0.0002$ | -0.0004 | 0.954 | 0.966 | 0.999 | 0 | 0 | 0 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.002 | -0.0022 | -0.002 | 0.946 | 0.936 | 0.943 | 0.007 | 0.007 | 0.007 |
| Tx = 0; $\rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T}=.1$ | 0.0018 | 0.0019 | 0.0017 | 0.935 | 0.94 | 0.935 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0012 | $-0.0012$ | -0.0012 | 0.949 | 0.95 | 0.948 | 0.005 | 0.005 | 0.005 |


| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0065 | 0.0067 | 0.0065 | 0.937 | 0.933 | 0.938 | 0.005 | 0.005 | 0.005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | -0.0045 | -0.0045 | -0.0045 | 0.939 | 0.939 | 0.938 | 0.027 | 0.027 | 0.027 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | -0.0009 | -0.0009 | -0.0009 | 0.947 | 0.947 | 0.946 | 0.025 | 0.025 | 0.025 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0003 | 0.0003 | 0.0003 | 0.915 | 0.917 | 0.916 | 0.027 | 0.027 | 0.027 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0018 | -0.0019 | -0.0019 | 0.934 | 0.935 | 0.932 | 0.025 | 0.025 | 0.025 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0015 | 0.0016 | 0.0015 | 0.958 | 0.941 | 0.941 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0003 | -0.0002 | -0.0003 | 0.968 | 0.964 | 0.963 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0004 | -0.0004 | -0.0005 | 0.957 | 0.959 | 0.966 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0 | 0.0001 | 0 | 0.945 | 0.959 | 0.998 | 0 | 0 | 0 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0011 | 0.001 | 0.0011 | 0.944 | 0.942 | 0.944 | 0.007 | 0.007 | 0.006 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0005 | -0.0004 | $-0.0005$ | 0.933 | 0.934 | 0.932 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.001 | -0.001 | -0.001 | 0.95 | 0.95 | 0.95 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.004 | -0.0039 | -0.0039 | 0.939 | 0.937 | 0.941 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0014 | -0.0014 | -0.0014 | 0.947 | 0.946 | 0.946 | 0.026 | 0.026 | 0.026 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ; S S R=2 ; ~ T 2=.5$ | 0.0061 | 0.0061 | 0.0061 | 0.945 | 0.945 | 0.944 | 0.024 | 0.024 | 0.024 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0057 | 0.0057 | 0.0057 | 0.921 | 0.924 | 0.922 | 0.027 | 0.027 | 0.027 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0039 | -0.0039 | $-0.0038$ | 0.957 | 0.954 | 0.956 | 0.022 | 0.022 | 0.022 |
| TX $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ \mathrm{~T}=0$ | 0.001 | 0.0018 | 0.0007 | 0.961 | 0.952 | 0.956 | 0.01 | 0.01 | 0.01 |
| Tx $=.1 ; \rho=0.40 ; ~ S S=20 ; S S R=1 ; ~ \mathrm{~T}=0$ | 0.0006 | 0.0003 | 0.0003 | 0.947 | 0.949 | 0.941 | 0.006 | 0.006 | 0.006 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0013 | 0.0015 | 0.0014 | 0.953 | 0.96 | 0.969 | 0.004 | 0.004 | 0.004 |
| Tx = . $1 ; \rho=0.81 ;$ SS =20; SSR $=1 ; \mathrm{T} 2=0$ | -0.0007 | -0.0013 | $-0.0006$ | 0.948 | 0.96 | 0.998 | 0.002 | 0.003 | 0.002 |
| Tx = . $1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0054 | -0.005 | $-0.0057$ | 0.93 | 0.933 | 0.933 | 0.015 | 0.016 | 0.015 |
| Tx = . $1 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0014 | -0.0015 | -0.0016 | 0.942 | 0.944 | 0.946 | 0.01 | 0.01 | 0.01 |
| Tx = . $1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ \mathrm{~T} 2=.1$ | -0.0006 | -0.0006 | $-0.0006$ | 0.924 | 0.93 | 0.932 | 0.01 | 0.009 | 0.009 |
| Tx = . $1 ; \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0016 | 0.0022 | 0.0017 | 0.926 | 0.932 | 0.934 | 0.007 | 0.007 | 0.007 |
| Tx = . $1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0041 | $-0.0036$ | -0.0042 | 0.935 | 0.936 | 0.937 | 0.034 | 0.034 | 0.034 |
| Tx = . $1 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0006 | $-0.0005$ | -0.0005 | 0.935 | 0.937 | 0.939 | 0.03 | 0.03 | 0.03 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0079 | 0.0077 | 0.0075 | 0.946 | 0.944 | 0.941 | 0.029 | 0.029 | 0.029 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0023 | 0.0017 | 0.0021 | 0.933 | 0.934 | 0.927 | 0.028 | 0.028 | 0.028 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0035 | -0.0028 | $-0.0036$ | 0.95 | 0.932 | 0.935 | 0.008 | 0.008 | 0.007 |


| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0032 | 0.0032 | 0.003 | 0.943 | 0.934 | 0.933 | 0.005 | 0.005 | 0.005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0053 | -0.0055 | $-0.0056$ | 0.954 | 0.948 | 0.963 | 0.003 | 0.003 | 0.003 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0005 | -0.0003 | -0.0004 | 0.958 | 0.968 | 0.999 | 0.001 | 0.002 | 0.001 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0009 | 0.0002 | -0.0013 | 0.936 | 0.926 | 0.934 | 0.014 | 0.015 | 0.014 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0 | -0.0002 | 0 | 0.938 | 0.94 | 0.943 | 0.01 | 0.01 | 0.009 |
| Tx = . $; 1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0029 | -0.0029 | -0.0032 | 0.922 | 0.918 | 0.929 | 0.009 | 0.009 | 0.009 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0036 | 0.0031 | 0.0036 | 0.938 | 0.931 | 0.938 | 0.006 | 0.007 | 0.006 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0027 | 0.0025 | 0.0028 | 0.935 | 0.934 | 0.933 | 0.033 | 0.033 | 0.033 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0021 | 0.0022 | 0.0021 | 0.929 | 0.933 | 0.931 | 0.029 | 0.029 | 0.029 |
| Tx $=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0008 | 0.0009 | 0.0009 | 0.928 | 0.925 | 0.927 | 0.03 | 0.03 | 0.03 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0041 | 0.004 | 0.0041 | 0.939 | 0.934 | 0.938 | 0.027 | 0.027 | 0.027 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | $-0.0005$ | 0.0001 | 0 | 0.951 | 0.93 | 0.936 | 0.004 | 0.004 | 0.004 |
| Tx = . $; 1 \rho=0.40 ; S S=50 ; S S R=1 ; ~ 72=0$ | -0.0006 | -0.0004 | -0.0002 | 0.958 | 0.954 | 0.956 | 0.002 | 0.002 | 0.002 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.001 | 0.0011 | 0.001 | 0.962 | 0.969 | 0.976 | 0.002 | 0.002 | 0.002 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0002 | -0.0004 | -0.0001 | 0.953 | 0.964 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = . $; 1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0005 | 0.0011 | 0.0004 | 0.943 | 0.936 | 0.943 | 0.009 | 0.009 | 0.009 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0011 | -0.0011 | -0.0011 | 0.951 | 0.95 | 0.95 | 0.007 | 0.007 | 0.007 |
| Tx = . $1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ 72=.1$ | -0.0018 | -0.0018 | -0.0018 | 0.94 | 0.935 | 0.938 | 0.006 | 0.006 | 0.006 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0004 | 0.0005 | 0.0004 | 0.935 | 0.928 | 0.932 | 0.006 | 0.006 | 0.006 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0026 | -0.003 | $-0.0026$ | 0.943 | 0.941 | 0.944 | 0.028 | 0.028 | 0.028 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0013 | -0.0012 | -0.0012 | 0.933 | 0.934 | 0.936 | 0.028 | 0.028 | 0.028 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0009 | 0.0009 | 0.0008 | 0.947 | 0.945 | 0.949 | 0.025 | 0.025 | 0.025 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0015 | 0.0017 | 0.0015 | 0.93 | 0.928 | 0.93 | 0.027 | 0.027 | 0.027 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0004 | -0.0004 | -0.0002 | 0.965 | 0.939 | 0.941 | 0.003 | 0.003 | 0.003 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0003 | 0.0005 | 0.0003 | 0.953 | 0.953 | 0.949 | 0.002 | 0.002 | 0.002 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0011 | 0.0009 | 0.001 | 0.963 | 0.967 | 0.974 | 0.001 | 0.001 | 0.001 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0002 | -0.0005 | -0.0001 | 0.949 | 0.967 | 0.997 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.006 | 0.0054 | 0.006 | 0.948 | 0.942 | 0.944 | 0.007 | 0.008 | 0.007 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0012 | -0.0012 | -0.0011 | 0.942 | 0.942 | 0.938 | 0.007 | 0.007 | 0.007 |
| Tx = $1 ; ~ \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0002 | 0.0002 | 0.0001 | 0.931 | 0.93 | 0.928 | 0.006 | 0.006 | 0.006 |


| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0041 | -0.0041 | -0.0043 | 0.942 | 0.938 | 0.939 | 0.005 | 0.005 | 0.005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0029 | 0.0031 | 0.0028 | 0.941 | 0.939 | 0.941 | 0.027 | 0.027 | 0.027 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0029 | 0.0029 | 0.0029 | 0.945 | 0.945 | 0.943 | 0.025 | 0.026 | 0.025 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0036 | 0.0037 | 0.0037 | 0.943 | 0.941 | 0.944 | 0.025 | 0.025 | 0.025 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0075$ | $-0.0073$ | -0.0074 | 0.935 | 0.938 | 0.934 | 0.025 | 0.025 | 0.025 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | $-0.0013$ | $-0.0019$ | -0.0014 | 0.967 | 0.938 | 0.942 | 0.002 | 0.002 | 0.002 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0002 | 0.0001 | 0.0001 | 0.962 | 0.955 | 0.955 | 0.001 | 0.001 | 0.001 |
| TX = . $;$; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0002 | 0.0004 | 0.0003 | 0.96 | 0.962 | 0.973 | 0.001 | 0.001 | 0.001 |
| TX = . $; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0007 | 0.0008 | 0.0007 | 0.959 | 0.974 | 0.999 | 0 | 0 | 0 |
| TX = . $; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0019 | $-0.0017$ | -0.0019 | 0.938 | 0.938 | 0.94 | 0.007 | 0.007 | 0.007 |
| TX = . $; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0042 | -0.0042 | -0.0042 | 0.947 | 0.948 | 0.949 | 0.006 | 0.006 | 0.006 |
| TX $=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0004 | -0.0004 | -0.0003 | 0.939 | 0.936 | 0.935 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0016 | 0.0013 | 0.0015 | 0.933 | 0.93 | 0.933 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0002 | 0.0004 | 0.0003 | 0.929 | 0.928 | 0.928 | 0.027 | 0.027 | 0.027 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0009 | -0.0009 | -0.0009 | 0.936 | 0.936 | 0.939 | 0.027 | 0.027 | 0.027 |
| TX $=.1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0034 | -0.0034 | -0.0034 | 0.919 | 0.921 | 0.919 | 0.026 | 0.026 | 0.026 |
| TX $=.1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0091 | -0.0092 | -0.0091 | 0.937 | 0.937 | 0.938 | 0.027 | 0.027 | 0.027 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.001 | -0.0011 | -0.001 | 0.954 | 0.934 | 0.931 | 0.002 | 0.002 | 0.002 |
| Tx = . $; ~ \rho=0.40 ;$ SS $=100 ; S S R=2 ; ~ T 2=0$ | 0.0002 | 0.0002 | 0.0003 | 0.95 | 0.943 | 0.94 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | $-0.0002$ | -0.0001 | -0.0003 | 0.963 | 0.97 | 0.971 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0008 | 0.0004 | 0.0009 | 0.955 | 0.97 | 0.998 | 0 | 0 | 0 |
| TX = . $; ~ \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0018 | 0.0017 | 0.0019 | 0.929 | 0.929 | 0.928 | 0.007 | 0.007 | 0.007 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0005 | $-0.0004$ | -0.0004 | 0.935 | 0.935 | 0.936 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0007$ | -0.0007 | -0.0008 | 0.931 | 0.93 | 0.93 | 0.006 | 0.006 | 0.006 |
| TX = . $1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | -0.0001 | 0 | -0.0001 | 0.936 | 0.934 | 0.938 | 0.005 | 0.005 | 0.005 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0049$ | -0.0049 | -0.0048 | 0.928 | 0.929 | 0.929 | 0.027 | 0.027 | 0.027 |
| TX = . $; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0043 | 0.0043 | 0.0043 | 0.93 | 0.933 | 0.927 | 0.027 | 0.027 | 0.027 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0082 | 0.0082 | 0.0082 | 0.943 | 0.946 | 0.943 | 0.024 | 0.024 | 0.024 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0021$ | -0.0022 | -0.0021 | 0.932 | 0.925 | 0.935 | 0.026 | 0.026 | 0.026 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0011 | 0.0011 | 0.0012 | 0.958 | 0.937 | 0.944 | 0.01 | 0.011 | 0.01 |


| Tx = . $; ~ \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0011 | 0.0009 | 0.0008 | 0.965 | 0.961 | 0.957 | 0.006 | 0.006 | 0.006 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.002 | -0.0016 | -0.0022 | 0.959 | 0.962 | 0.977 | 0.004 | 0.004 | 0.004 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0009 | 0.0021 | 0.0013 | 0.953 | 0.961 | 0.999 | 0.002 | 0.002 | 0.002 |
| Tx $=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.001 | -0.0009 | -0.0007 | 0.937 | 0.934 | 0.939 | 0.016 | 0.016 | 0.016 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0048 | -0.0045 | -0.0045 | 0.946 | 0.944 | 0.948 | 0.011 | 0.011 | 0.011 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0027 | 0.0024 | 0.002 | 0.939 | 0.944 | 0.938 | 0.009 | 0.009 | 0.009 |
| TX $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0037 | -0.0035 | -0.0045 | 0.931 | 0.92 | 0.936 | 0.007 | 0.008 | 0.007 |
| Tx $=.5 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0011 | -0.0013 | -0.0014 | 0.935 | 0.937 | 0.935 | 0.034 | 0.035 | 0.034 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0088 | 0.009 | 0.0089 | 0.934 | 0.934 | 0.936 | 0.031 | 0.031 | 0.031 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0038 | -0.0038 | -0.0038 | 0.942 | 0.941 | 0.94 | 0.03 | 0.03 | 0.03 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.005 | -0.0049 | -0.0051 | 0.935 | 0.932 | 0.933 | 0.028 | 0.028 | 0.028 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.004 | 0.0058 | 0.0042 | 0.955 | 0.942 | 0.937 | 0.008 | 0.008 | 0.008 |
| Tx = . $; ~ \rho=0.40 ; S S=20 ; S S R=2 ; ~ t 2=0$ | 0.0007 | 0.0012 | 0.0006 | 0.957 | 0.945 | 0.948 | 0.005 | 0.005 | 0.005 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0031 | -0.0026 | -0.0028 | 0.954 | 0.964 | 0.97 | 0.003 | 0.003 | 0.003 |
| Tx $=.5 ; \rho=0.81 ;$ SS =20; SSR $=2 ; \mathrm{T} 2=0$ | 0.0007 | 0.0011 | 0.0009 | 0.944 | 0.959 | 0.997 | 0.002 | 0.002 | 0.002 |
| Tx $=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.005 | -0.0042 | -0.0047 | 0.943 | 0.937 | 0.936 | 0.013 | 0.013 | 0.013 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0003 | 0.0004 | 0.0004 | 0.946 | 0.943 | 0.944 | 0.009 | 0.009 | 0.009 |
| Tx $=.5 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | $-0.0008$ | -0.0012 | $-0.0007$ | 0.936 | 0.933 | 0.935 | 0.008 | 0.008 | 0.008 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0032 | -0.0037 | -0.003 | 0.942 | 0.943 | 0.943 | 0.006 | 0.006 | 0.006 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=.5$ | -0.0005 | -0.0005 | -0.0005 | 0.925 | 0.921 | 0.928 | 0.034 | 0.034 | 0.034 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0078 | -0.0078 | $-0.0076$ | 0.927 | 0.923 | 0.928 | 0.03 | 0.03 | 0.03 |
| Tx $=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0021 | -0.002 | -0.0021 | 0.936 | 0.939 | 0.936 | 0.028 | 0.028 | 0.028 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0016 | -0.002 | -0.0018 | 0.936 | 0.929 | 0.934 | 0.027 | 0.027 | 0.027 |
| Tx = . $; ~ \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0019 | -0.0014 | -0.0018 | 0.957 | 0.93 | 0.939 | 0.004 | 0.004 | 0.004 |
| Tx $=.5 ; \rho=0.40 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=0$ | -0.0015 | -0.0014 | -0.0017 | 0.966 | 0.96 | 0.959 | 0.002 | 0.002 | 0.002 |
| TX $=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0014 | -0.0018 | -0.0016 | 0.961 | 0.975 | 0.978 | 0.002 | 0.002 | 0.002 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0002 | $-0.0006$ | -0.0001 | 0.946 | 0.959 | 0.995 | 0.001 | 0.001 | 0.001 |
| Tx $=.5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0006 | 0.0009 | 0.0006 | 0.927 | 0.93 | 0.925 | 0.01 | 0.01 | 0.009 |
| Tx $=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.001 | -0.001 | -0.0009 | 0.93 | 0.93 | 0.931 | 0.007 | 0.007 | 0.007 |
| Tx $=.5 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0012 | $-0.0013$ | -0.0012 | 0.941 | 0.939 | 0.935 | 0.006 | 0.006 | 0.006 |


| Tx = . $; ~ \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=.1$ | $-0.0004$ | -0.0002 | -0.0004 | 0.944 | 0.937 | 0.941 | 0.005 | 0.006 | 0.006 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0099 | -0.01 | -0.01 | 0.929 | 0.929 | 0.928 | 0.03 | 0.03 | 0.03 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0027 | 0.0027 | 0.0028 | 0.933 | 0.932 | 0.932 | 0.028 | 0.028 | 0.028 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0007 | 0.0007 | 0.0007 | 0.933 | 0.936 | 0.935 | 0.027 | 0.027 | 0.027 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0056$ | -0.0053 | -0.0056 | 0.953 | 0.947 | 0.952 | 0.024 | 0.024 | 0.024 |
| Tx $=.5 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0008 | 0.0005 | 0.0009 | 0.95 | 0.923 | 0.93 | 0.003 | 0.003 | 0.003 |
| Tx $=.5 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | $-0.0001$ | -0.0002 | -0.0003 | 0.956 | 0.955 | 0.951 | 0.002 | 0.002 | 0.002 |
| Tx $=.5 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0011 | 0.0008 | 0.0009 | 0.955 | 0.966 | 0.97 | 0.001 | 0.001 | 0.001 |
| Tx $=.5 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=0$ | 0.0005 | 0.0004 | 0.0004 | 0.952 | 0.964 | 0.996 | 0.001 | 0.001 | 0.001 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0013 | 0.0013 | 0.0012 | 0.922 | 0.919 | 0.92 | 0.009 | 0.009 | 0.009 |
| Tx = . $; ~ \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0039$ | $-0.0041$ | -0.0039 | 0.922 | 0.928 | 0.925 | 0.007 | 0.007 | 0.007 |
| Tx = . $; ~ \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.002 | $-0.0019$ | -0.0019 | 0.941 | 0.94 | 0.941 | 0.006 | 0.006 | 0.006 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=.1$ | $-0.0005$ | $-0.0007$ | -0.0005 | 0.924 | 0.93 | 0.924 | 0.006 | 0.006 | 0.006 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0124 | -0.0125 | -0.0124 | 0.943 | 0.942 | 0.942 | 0.026 | 0.026 | 0.026 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0076 | 0.0076 | 0.0076 | 0.927 | 0.926 | 0.926 | 0.028 | 0.028 | 0.028 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0001 | 0.0002 | 0.0001 | 0.934 | 0.934 | 0.939 | 0.025 | 0.025 | 0.025 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0023 | 0.0023 | 0.0024 | 0.936 | 0.937 | 0.941 | 0.026 | 0.026 | 0.026 |
| TX $=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | 0.0014 | 0.0012 | 0.0013 | 0.963 | 0.936 | 0.937 | 0.002 | 0.002 | 0.002 |
| Tx = . $; ~ \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | $-0.0021$ | -0.0021 | -0.0021 | 0.962 | 0.952 | 0.94 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=.5 ; \rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0 | 0.0002 | 0.0001 | 0.958 | 0.959 | 0.969 | 0.001 | 0.001 | 0.001 |
| TX = .5; $\rho=0.81 ;$ SS = 100; SSR $=1 ; ~ T 2=0$ | 0.0014 | 0.0016 | 0.0013 | 0.956 | 0.965 | 1 | 0 | 0 | 0 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.001 | -0.0012 | -0.0009 | 0.932 | 0.931 | 0.93 | 0.007 | 0.007 | 0.007 |
| TX $=.5 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | $-0.0019$ | -0.0018 | -0.0018 | 0.938 | 0.941 | 0.939 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0003 | 0.0003 | 0.0004 | 0.94 | 0.939 | 0.94 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ; S S R=1 ; ~ T 2=.1$ | 0.0031 | 0.0028 | 0.003 | 0.934 | 0.932 | 0.936 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0034$ | $-0.0034$ | -0.0034 | 0.931 | 0.934 | 0.932 | 0.028 | 0.028 | 0.028 |
| TX $=.5 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0002 | $-0.0002$ | -0.0002 | 0.926 | 0.926 | 0.927 | 0.026 | 0.026 | 0.026 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0002 | 0.0002 | 0.0002 | 0.924 | 0.927 | 0.928 | 0.026 | 0.026 | 0.026 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | -0.0045 | $-0.0046$ | -0.0045 | 0.936 | 0.933 | 0.936 | 0.026 | 0.026 | 0.026 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0008 | -0.001 | -0.0008 | 0.957 | 0.938 | 0.94 | 0.001 | 0.002 | 0.001 |


| Tx = . $5 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=0$ | -0.0017 | $-0.0017$ | -0.0018 | 0.949 | 0.943 | 0.936 | 0.001 | 0.001 | 0.001 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = . 5; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0006 | $-0.0007$ | -0.0007 | 0.941 | 0.95 | 0.964 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0001 | 0 | -0.0001 | 0.963 | 0.98 | 0.998 | 0 | 0 | 0 |
| $\mathrm{T} x=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0036 | 0.0035 | 0.0036 | 0.941 | 0.945 | 0.943 | 0.006 | 0.006 | 0.006 |
| $\mathrm{T} x=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0017 | 0.0017 | 0.0017 | 0.932 | 0.933 | 0.933 | 0.006 | 0.006 | 0.006 |
| $\mathrm{T} x=.5 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0011 | 0.0011 | 0.0011 | 0.932 | 0.933 | 0.93 | 0.006 | 0.006 | 0.006 |
| Tx = .5; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0009 | 0.001 | 0.0009 | 0.943 | 0.943 | 0.945 | 0.005 | 0.005 | 0.005 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0038 | -0.0039 | -0.0038 | 0.943 | 0.947 | 0.946 | 0.026 | 0.026 | 0.026 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0077 | 0.0077 | 0.0077 | 0.939 | 0.936 | 0.94 | 0.027 | 0.027 | 0.027 |
| Tx = . $5 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | 0.0088 | 0.0088 | 0.0088 | 0.937 | 0.937 | 0.938 | 0.025 | 0.025 | 0.025 |
| Tx = . $5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0009 | 0.001 | 0.001 | 0.935 | 0.935 | 0.937 | 0.025 | 0.025 | 0.025 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0052 | 0.0039 | 0.005 | 0.961 | 0.949 | 0.952 | 0.01 | 0.01 | 0.01 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0024 | 0.0028 | 0.0028 | 0.938 | 0.933 | 0.929 | 0.007 | 0.007 | 0.007 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0038 | -0.0035 | -0.004 | 0.95 | 0.959 | 0.972 | 0.004 | 0.004 | 0.004 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=0$ | 0.0014 | 0.0028 | 0.0016 | 0.956 | 0.963 | 0.998 | 0.002 | 0.002 | 0.002 |
| Tx = 1; $\rho=0.00 ;$ SS =20; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.003 | 0.0022 | 0.0027 | 0.936 | 0.937 | 0.934 | 0.016 | 0.016 | 0.015 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | -0.0042 | $-0.0042$ | $-0.0043$ | 0.941 | 0.939 | 0.939 | 0.01 | 0.01 | 0.01 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.1$ | 0.0009 | 0.0009 | 0.0009 | 0.929 | 0.921 | 0.925 | 0.01 | 0.01 | 0.01 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ \mathrm{~T} 2=.1$ | -0.002 | $-0.0023$ | -0.002 | 0.936 | 0.926 | 0.931 | 0.007 | 0.007 | 0.007 |
| Tx = 1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.002 | $-0.0023$ | -0.0023 | 0.935 | 0.935 | 0.935 | 0.036 | 0.036 | 0.035 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0005 | 0.0002 | 0.0001 | 0.947 | 0.949 | 0.942 | 0.03 | 0.03 | 0.03 |
| Tx $=1 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0086 | $-0.0084$ | $-0.0086$ | 0.941 | 0.947 | 0.946 | 0.029 | 0.029 | 0.029 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0085 | $-0.0087$ | -0.0088 | 0.947 | 0.945 | 0.945 | 0.025 | 0.025 | 0.025 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ t 2=0$ | 0.0002 | -0.0001 | 0.0004 | 0.957 | 0.95 | 0.948 | 0.007 | 0.007 | 0.007 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0013 | 0.0013 | 0.001 | 0.948 | 0.953 | 0.951 | 0.005 | 0.005 | 0.005 |
| Tx $=1 ; \rho=0.59 ;$ SS = 20; SSR $=2 ; \mathrm{T} 2=0$ | 0.0009 | 0.0011 | 0.0006 | 0.945 | 0.946 | 0.962 | 0.003 | 0.003 | 0.003 |
| $\mathrm{Tx}=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0007 | 0 | -0.0002 | 0.948 | 0.963 | 0.998 | 0.002 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0037 | $-0.0045$ | -0.003 | 0.944 | 0.937 | 0.938 | 0.012 | 0.013 | 0.012 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0061 | 0.006 | 0.0058 | 0.949 | 0.951 | 0.946 | 0.009 | 0.009 | 0.009 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0008 | 0.0008 | 0.0007 | 0.94 | 0.942 | 0.943 | 0.008 | 0.008 | 0.008 |


| Tx = 1; $\rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | $-0.0023$ | -0.0028 | -0.0021 | 0.95 | 0.95 | 0.952 | 0.006 | 0.006 | 0.006 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0098 | -0.0098 | -0.0092 | 0.952 | 0.954 | 0.95 | 0.028 | 0.028 | 0.028 |
| Tx = 1; $\rho=0.40 ;$ SS $=20 ; S S R=2 ; ~ T 2=.5$ | 0.0032 | 0.0034 | 0.0033 | 0.93 | 0.93 | 0.929 | 0.031 | 0.031 | 0.031 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0024 | 0.0021 | 0.0021 | 0.939 | 0.941 | 0.939 | 0.028 | 0.028 | 0.028 |
| $\mathrm{TX}=1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0085 | -0.0087 | -0.0084 | 0.925 | 0.921 | 0.922 | 0.029 | 0.029 | 0.029 |
| TX $=1 ; \rho=0.00 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0016 | 0.0014 | 0.0013 | 0.961 | 0.947 | 0.939 | 0.004 | 0.004 | 0.004 |
| TX $=1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0008 | 0.0006 | 0.0006 | 0.947 | 0.937 | 0.934 | 0.003 | 0.003 | 0.003 |
| TX $=1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0013 | 0.0013 | 0.0013 | 0.963 | 0.965 | 0.969 | 0.002 | 0.002 | 0.002 |
| TX $=1 ; \rho=0.81 ;$ SS $=50 ; S S R=1 ; ~ T 2=0$ | 0.0024 | 0.0028 | 0.0022 | 0.936 | 0.959 | 0.996 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0011 | -0.0012 | -0.001 | 0.934 | 0.93 | 0.929 | 0.009 | 0.009 | 0.009 |
| Tx = 1; $\rho=0.40 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | $-0.0009$ | -0.0009 | -0.0009 | 0.945 | 0.944 | 0.947 | 0.007 | 0.007 | 0.007 |
| Tx = 1; $\rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0024 | -0.0025 | -0.0024 | 0.937 | 0.937 | 0.935 | 0.007 | 0.007 | 0.007 |
| Tx = 1; $\rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0033 | 0.0033 | 0.0034 | 0.931 | 0.931 | 0.935 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.00 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.5$ | -0.0032 | -0.003 | -0.0031 | 0.936 | 0.932 | 0.935 | 0.03 | 0.029 | 0.03 |
| Tx = 1; $\rho=0.40 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0 | 0 | 0.0001 | 0.937 | 0.935 | 0.935 | 0.027 | 0.027 | 0.027 |
| Tx = 1; $\rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0005 | -0.0005 | -0.0005 | 0.922 | 0.92 | 0.92 | 0.028 | 0.028 | 0.028 |
| Tx = 1; $\rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0008 | 0.0006 | 0.0008 | 0.925 | 0.926 | 0.925 | 0.027 | 0.027 | 0.027 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0028 | -0.0027 | -0.0031 | 0.963 | 0.946 | 0.949 | 0.003 | 0.003 | 0.003 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0006 | 0.0005 | 0.0006 | 0.961 | 0.95 | 0.945 | 0.002 | 0.002 | 0.002 |
| TX $=1 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0 | 0 | 0 | 0.949 | 0.954 | 0.965 | 0.001 | 0.001 | 0.001 |
| TX $=1 ; \rho=0.81 ;$ SS = 50; SSR $=2 ;$ T2 $=0$ | $-0.0007$ | -0.0006 | $-0.0006$ | 0.957 | 0.966 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ;$ SS $=50 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0086 | 0.0083 | 0.0087 | 0.935 | 0.935 | 0.932 | 0.008 | 0.008 | 0.008 |
| Tx = 1; $\rho=0.40 ;$ SS $=50 ;$ SSR $=2 ;$ T2 2 . 1 | 0.0033 | 0.0032 | 0.0033 | 0.946 | 0.95 | 0.947 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0002 | -0.0001 | -0.0003 | 0.941 | 0.94 | 0.939 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0012 | -0.0013 | -0.0012 | 0.931 | 0.936 | 0.931 | 0.006 | 0.006 | 0.006 |
| Tx $=1 ; \rho=0.00 ;$ SS $=50 ; S S R=2 ; ~ T 2=.5$ | 0.0065 | 0.0065 | 0.0066 | 0.941 | 0.94 | 0.941 | 0.027 | 0.027 | 0.027 |
| Tx = 1; $\rho=0.40 ;$ SS $=50 ;$ SSR $=2 ;$ T2 2.5 | -0.0015 | -0.0015 | -0.0015 | 0.943 | 0.942 | 0.944 | 0.026 | 0.026 | 0.026 |
| $\mathrm{Tx}=1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0085 | -0.0086 | -0.0086 | 0.936 | 0.942 | 0.94 | 0.025 | 0.025 | 0.025 |
| Tx = 1; $\rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0097$ | -0.0095 | -0.0097 | 0.939 | 0.94 | 0.942 | 0.025 | 0.025 | 0.025 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.001 | -0.0008 | -0.0009 | 0.962 | 0.942 | 0.937 | 0.002 | 0.002 | 0.002 |


| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=0$ | 0.0008 | 0.0008 | 0.0008 | 0.958 | 0.951 | 0.949 | 0.001 | 0.001 | 0.001 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T}=0$ | -0.0005 | $-0.0006$ | -0.0005 | 0.96 | 0.963 | 0.967 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.81 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0002 | 0.0004 | 0.0001 | 0.96 | 0.972 | 0.999 | 0 | 0 | 0 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T}=.1$ | $-0.0001$ | $-0.0001$ | -0.0002 | 0.941 | 0.941 | 0.94 | 0.007 | 0.007 | 0.007 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T}=.1$ | -0.003 | -0.003 | -0.003 | 0.931 | 0.932 | 0.929 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ;$ SS = 100; SSR $=1 ; \mathrm{T} 2=.1$ | 0.0005 | 0.0003 | 0.0004 | 0.932 | 0.93 | 0.935 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T}=.1$ | $-0.0021$ | $-0.0019$ | -0.002 | 0.934 | 0.936 | 0.938 | 0.005 | 0.005 | 0.005 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0066 | 0.0067 | 0.0065 | 0.949 | 0.947 | 0.947 | 0.026 | 0.026 | 0.026 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T}=.5$ | $-0.0121$ | -0.0121 | -0.0121 | 0.946 | 0.945 | 0.944 | 0.026 | 0.026 | 0.026 |
| Tx = 1; $\rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | -0.0024 | $-0.0024$ | -0.0024 | 0.929 | 0.929 | 0.931 | 0.026 | 0.026 | 0.026 |
| Tx $=1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | $-0.0016$ | $-0.0017$ | -0.0016 | 0.932 | 0.934 | 0.936 | 0.025 | 0.025 | 0.025 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0003 | 0 | -0.0004 | 0.956 | 0.928 | 0.938 | 0.001 | 0.002 | 0.001 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}^{2}=0$ | 0 | -0.0001 | -0.0001 | 0.974 | 0.969 | 0.966 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0003 | 0.0002 | 0.0002 | 0.959 | 0.965 | 0.973 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}=0$ | $-0.0003$ | $-0.0004$ | -0.0004 | 0.955 | 0.973 | 0.998 | 0 | 0 | 0 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0029 | $-0.0029$ | -0.0028 | 0.936 | 0.937 | 0.935 | 0.007 | 0.007 | 0.007 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0029 | $-0.0028$ | -0.0028 | 0.941 | 0.941 | 0.94 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}^{2}=.1$ | 0.0021 | 0.0021 | 0.0021 | 0.929 | 0.933 | 0.93 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | $-0.0003$ | $-0.0003$ | -0.0003 | 0.948 | 0.943 | 0.948 | 0.005 | 0.005 | 0.005 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0021 | 0.002 | 0.0021 | 0.928 | 0.93 | 0.928 | 0.028 | 0.028 | 0.028 |
| Tx = 1; $\rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}^{2}=.5$ | -0.005 | -0.005 | -0.005 | 0.944 | 0.944 | 0.943 | 0.024 | 0.024 | 0.024 |
| Tx $=1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}^{2}=.5$ | 0.0005 | 0.0005 | 0.0005 | 0.944 | 0.945 | 0.945 | 0.023 | 0.023 | 0.023 |
| Tx $=1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0041 | -0.0041 | -0.0041 | 0.942 | 0.929 | 0.942 | 0.026 | 0.026 | 0.026 |
| $T x=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | $-0.0023$ | -0.0017 | -0.0019 | 0.952 | 0.93 | 0.932 | 0.013 | 0.014 | 0.013 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | -0.0041 | $-0.0034$ | -0.0034 | 0.961 | 0.949 | 0.956 | 0.008 | 0.008 | 0.008 |
| Tx $=0 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0033 | 0.0028 | 0.0036 | 0.947 | 0.959 | 0.964 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=0$ | $-0.0013$ | $-0.0008$ | -0.0005 | 0.958 | 0.976 | 0.997 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.00 ;$ SS $=20 ; S S R=1 ; ~ T 2=.1$ | $-0.0062$ | $-0.0046$ | -0.0057 | 0.944 | 0.941 | 0.941 | 0.018 | 0.018 | 0.017 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ; S S R=1 ; ~ T 2=.1$ | 0.0011 | 0.0017 | 0.0014 | 0.915 | 0.916 | 0.916 | 0.014 | 0.014 | 0.014 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ; S S R=1 ; ~ T 2=.1$ | -0.0025 | $-0.0023$ | -0.0028 | 0.933 | 0.937 | 0.937 | 0.011 | 0.011 | 0.011 |


| Tx $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | $-0.0032$ | $-0.0032$ | -0.004 | 0.934 | 0.927 | 0.942 | 0.008 | 0.008 | 0.008 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | 0.0017 | 0.0029 | 0.0024 | 0.933 | 0.933 | 0.94 | 0.038 | 0.038 | 0.038 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.005 | -0.0048 | -0.0047 | 0.928 | 0.933 | 0.932 | 0.033 | 0.033 | 0.033 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; ~$ r2 $=.5$ | $-0.0016$ | -0.0012 | -0.0011 | 0.928 | 0.929 | 0.926 | 0.032 | 0.032 | 0.032 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~$ 2 $2=.5$ | $-0.0001$ | -0.0015 | -0.0003 | 0.93 | 0.928 | 0.932 | 0.029 | 0.03 | 0.029 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | $-0.0024$ | -0.0031 | -0.0026 | 0.957 | 0.938 | 0.937 | 0.009 | 0.009 | 0.009 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0024 | 0.0023 | 0.0024 | 0.957 | 0.951 | 0.953 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | -0.0009 | -0.0005 | -0.0006 | 0.953 | 0.949 | 0.962 | 0.004 | 0.004 | 0.004 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=0$ | -0.002 | -0.0015 | -0.0022 | 0.953 | 0.974 | 0.999 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.001 | 0.0008 | 0.0013 | 0.939 | 0.939 | 0.939 | 0.013 | 0.013 | 0.013 |
| Tx $=0 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.002 | $-0.0025$ | -0.0027 | 0.944 | 0.94 | 0.938 | 0.01 | 0.01 | 0.01 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0005 | 0.0006 | 0.0007 | 0.932 | 0.94 | 0.931 | 0.009 | 0.009 | 0.009 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=.1$ | 0.0065 | 0.0063 | 0.0066 | 0.927 | 0.925 | 0.93 | 0.007 | 0.008 | 0.007 |
| Tx $=0 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0013 | 0.0019 | 0.0012 | 0.942 | 0.946 | 0.943 | 0.031 | 0.031 | 0.031 |
| Tx $=0 ; \rho=0.40 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.5$ | $-0.0065$ | $-0.0065$ | -0.0064 | 0.945 | 0.944 | 0.943 | 0.03 | 0.03 | 0.03 |
| Tx $=0 ; \rho=0.59 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0098 | 0.0099 | 0.0099 | 0.923 | 0.917 | 0.92 | 0.032 | 0.032 | 0.032 |
| Tx $=0 ; \rho=0.81 ;$ SS $=20 ; S S R=2 ; ~ T 2=.5$ | 0.007 | 0.0069 | 0.0071 | 0.946 | 0.951 | 0.947 | 0.025 | 0.025 | 0.025 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | $-0.0022$ | -0.0023 | -0.0023 | 0.952 | 0.933 | 0.928 | 0.005 | 0.005 | 0.005 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=1 ; ~$ 2 $2=0$ | $-0.0004$ | $-0.0006$ | $-0.0006$ | 0.961 | 0.955 | 0.955 | 0.003 | 0.003 | 0.003 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=0$ | 0.0025 | 0.0024 | 0.0023 | 0.942 | 0.947 | 0.956 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.81 ; ~ S S=50 ; ~ S S R=1 ; ~ T 2=0$ | 0.0012 | 0.001 | 0.0011 | 0.952 | 0.975 | 0.995 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; ~ S S R=1 ; ~ T 2=.1$ | 0.0046 | 0.0048 | 0.0047 | 0.932 | 0.933 | 0.932 | 0.01 | 0.01 | 0.01 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=1 ; ~$ 2 $2=.1$ | -0.0034 | -0.0034 | -0.0034 | 0.94 | 0.94 | 0.935 | 0.008 | 0.008 | 0.008 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | $-0.0002$ | -0.0001 | -0.0004 | 0.931 | 0.929 | 0.934 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{r} 2=.1$ | -0.0011 | -0.0012 | -0.0012 | 0.923 | 0.925 | 0.925 | 0.006 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.00 ; S S=50 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0003 | 0 | 0.0002 | 0.932 | 0.928 | 0.931 | 0.03 | 0.03 | 0.03 |
| Tx $=0 ; \rho=0.40 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.5$ | $-0.0017$ | $-0.0017$ | -0.0016 | 0.912 | 0.916 | 0.913 | 0.03 | 0.03 | 0.03 |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0136 | 0.0137 | 0.0137 | 0.929 | 0.93 | 0.932 | 0.029 | 0.029 | 0.029 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~$ 2 $2=.5$ | -0.0021 | -0.0022 | -0.002 | 0.938 | 0.942 | 0.939 | 0.025 | 0.025 | 0.025 |
| Tx $=0 ; \rho=0.00 ; S S=50 ;$ SSR $=2 ; ~ T 2=0$ | 0.0008 | 0.0003 | 0.0005 | 0.957 | 0.939 | 0.933 | 0.003 | 0.004 | 0.003 |


| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ t 2=0$ | 0.0007 | 0.0007 | 0.0006 | 0.965 | 0.956 | 0.947 | 0.002 | 0.002 | 0.002 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx $=0 ; \rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0004 | 0.0004 | 0.0003 | 0.972 | 0.972 | 0.979 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | -0.0003 | 0.0002 | -0.0003 | 0.953 | 0.963 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0014 | 0.0015 | 0.0013 | 0.943 | 0.946 | 0.944 | 0.008 | 0.008 | 0.008 |
| Tx $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0002 | 0.0004 | 0.0004 | 0.931 | 0.931 | 0.928 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.59 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | $-0.0005$ | -0.0006 | -0.0005 | 0.925 | 0.926 | 0.924 | 0.007 | 0.007 | 0.007 |
| TX $=0 ; \rho=0.81 ;$ SS = 50; SSR $=2 ; \mathrm{T} 2=.1$ | -0.0001 | -0.0001 | -0.0001 | 0.933 | 0.933 | 0.932 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.0072 | 0.0074 | 0.0072 | 0.937 | 0.937 | 0.936 | 0.031 | 0.031 | 0.031 |
| TX $=0 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | 0.017 | 0.0169 | 0.0171 | 0.944 | 0.942 | 0.943 | 0.028 | 0.028 | 0.028 |
| TX $=0 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0112 | 0.0111 | 0.0111 | 0.938 | 0.941 | 0.937 | 0.026 | 0.026 | 0.026 |
| Tx $=0 ; \rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0027 | 0.0027 | 0.0027 | 0.946 | 0.943 | 0.945 | 0.025 | 0.025 | 0.025 |
| Tx $=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | $-0.0002$ | 0.0002 | $-0.0001$ | 0.947 | 0.93 | 0.933 | 0.003 | 0.003 | 0.002 |
| $T \mathrm{~T}=0 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0006 | 0.0007 | 0.0009 | 0.959 | 0.956 | 0.947 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=0$ | 0.0016 | 0.0015 | 0.0015 | 0.948 | 0.952 | 0.968 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=1 ; ~ T 2=0$ | $-0.0007$ | $-0.0006$ | $-0.0007$ | 0.957 | 0.973 | 0.998 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0051 | -0.0052 | -0.0051 | 0.933 | 0.93 | 0.932 | 0.008 | 0.008 | 0.008 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | -0.0044 | -0.0044 | -0.0044 | 0.938 | 0.94 | 0.94 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.1$ | -0.0016 | -0.0015 | -0.0015 | 0.944 | 0.945 | 0.944 | 0.006 | 0.006 | 0.006 |
| $T x=0 ; \rho=0.81 ; S S=100 ; S S R=1 ; ~ T 2=.1$ | 0 | 0.0001 | 0 | 0.949 | 0.944 | 0.945 | 0.005 | 0.005 | 0.005 |
| $T x=0 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0039 | 0.0041 | 0.0039 | 0.926 | 0.932 | 0.926 | 0.028 | 0.028 | 0.028 |
| Tx $=0 ; \rho=0.40 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | -0.0043 | -0.0043 | $-0.0043$ | 0.936 | 0.936 | 0.936 | 0.027 | 0.027 | 0.027 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=1 ; ~ T 2=.5$ | 0.0001 | 0.0001 | 0.0001 | 0.926 | 0.926 | 0.929 | 0.027 | 0.027 | 0.027 |
| Tx $=0 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0024 | 0.0023 | 0.0024 | 0.941 | 0.944 | 0.941 | 0.025 | 0.025 | 0.025 |
| $T x=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0018 | 0.0019 | 0.0018 | 0.954 | 0.934 | 0.938 | 0.002 | 0.002 | 0.002 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0 | -0.0002 | -0.0001 | 0.956 | 0.951 | 0.948 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=0$ | 0.0009 | 0.0008 | 0.0009 | 0.951 | 0.954 | 0.968 | 0.001 | 0.001 | 0.001 |
| Tx $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0001 | -0.001 | -0.0001 | 0.954 | 0.96 | 0.999 | 0 | 0 | 0 |
| $T x=0 ; \rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.0018 | -0.0022 | -0.0018 | 0.923 | 0.924 | 0.919 | 0.007 | 0.007 | 0.007 |
| Tx $=0 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | -0.0038 | -0.0038 | -0.0038 | 0.944 | 0.942 | 0.942 | 0.006 | 0.006 | 0.006 |
| Tx $=0 ; \rho=0.59 ; S S=100 ; S S R=2 ; ~ T 2=.1$ | 0.0006 | 0.0006 | 0.0007 | 0.924 | 0.923 | 0.922 | 0.006 | 0.006 | 0.006 |


| TX $=0 ; \rho=0.81 ; ~ S S=100 ; S S R=2 ; ~ T 2=.1$ | -0.003 | -0.0029 | -0.003 | 0.928 | 0.925 | 0.928 | 0.006 | 0.006 | 0.006 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX = 0; $\rho=0.00 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | $-0.0022$ | -0.0022 | -0.0022 | 0.946 | 0.945 | 0.946 | 0.026 | 0.026 | 0.026 |
| TX $=0 ; \rho=0.40 ; S S=100 ; S S R=2 ; ~ T 2=.5$ | -0.0019 | -0.0019 | -0.0019 | 0.937 | 0.938 | 0.938 | 0.025 | 0.025 | 0.025 |
| TX $=0 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | -0.0106 | $-0.0106$ | -0.0106 | 0.931 | 0.93 | 0.932 | 0.028 | 0.028 | 0.028 |
| TX $=0 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; ~ \mathrm{~T} 2=.5$ | 0.0073 | 0.0072 | 0.0073 | 0.93 | 0.923 | 0.931 | 0.026 | 0.026 | 0.026 |
| Tx = .1; $\rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0035 | 0.0039 | 0.0038 | 0.951 | 0.934 | 0.937 | 0.013 | 0.013 | 0.013 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | $-0.0045$ | -0.0051 | -0.0049 | 0.955 | 0.953 | 0.954 | 0.008 | 0.008 | 0.008 |
| Tx = .1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0013 | -0.0015 | -0.0018 | 0.949 | 0.954 | 0.965 | 0.005 | 0.006 | 0.005 |
| Tx = .1; $\rho=0.81 ; ~ S S=20 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | $-0.0004$ | 0.0011 | 0.0001 | 0.951 | 0.968 | 0.996 | 0.003 | 0.003 | 0.003 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0006 | -0.001 | 0.001 | 0.955 | 0.94 | 0.949 | 0.017 | 0.017 | 0.017 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0057 | 0.0057 | 0.0061 | 0.931 | 0.937 | 0.932 | 0.014 | 0.014 | 0.014 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0052 | 0.0053 | 0.0051 | 0.937 | 0.933 | 0.936 | 0.01 | 0.01 | 0.01 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0003 | -0.0009 | 0.0007 | 0.932 | 0.928 | 0.936 | 0.008 | 0.008 | 0.008 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0038 | -0.0044 | -0.0038 | 0.943 | 0.939 | 0.945 | 0.035 | 0.035 | 0.035 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0022$ | -0.0021 | -0.0019 | 0.914 | 0.912 | 0.911 | 0.036 | 0.036 | 0.036 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0002 | 0.0001 | 0.0001 | 0.941 | 0.94 | 0.937 | 0.031 | 0.031 | 0.031 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0004 | 0 | 0.0004 | 0.928 | 0.931 | 0.928 | 0.028 | 0.028 | 0.028 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0037 | 0.002 | 0.0034 | 0.952 | 0.924 | 0.921 | 0.01 | 0.01 | 0.009 |
| Tx = . $1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | $-0.0011$ | $-0.0004$ | -0.0009 | 0.967 | 0.967 | 0.964 | 0.005 | 0.005 | 0.005 |
| Tx = .1; $\rho=0.59 ;$ SS $=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.004 | 0.004 | 0.0045 | 0.952 | 0.96 | 0.972 | 0.004 | 0.004 | 0.004 |
| Tx = .1; $\rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0008 | 0.0002 | 0.0002 | 0.955 | 0.962 | 0.992 | 0.002 | 0.002 | 0.002 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0009 | $-0.0025$ | -0.001 | 0.935 | 0.935 | 0.934 | 0.014 | 0.014 | 0.014 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0025$ | $-0.0025$ | -0.0025 | 0.925 | 0.923 | 0.927 | 0.011 | 0.011 | 0.011 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0075 | 0.0077 | 0.0076 | 0.933 | 0.932 | 0.934 | 0.009 | 0.009 | 0.009 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.005 | 0.0053 | 0.0047 | 0.929 | 0.934 | 0.933 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0021$ | -0.0019 | -0.0023 | 0.942 | 0.937 | 0.942 | 0.032 | 0.032 | 0.032 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0063 | 0.0064 | 0.0065 | 0.935 | 0.937 | 0.938 | 0.029 | 0.029 | 0.029 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0066$ | $-0.0067$ | -0.0068 | 0.935 | 0.939 | 0.941 | 0.03 | 0.03 | 0.03 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0052 | 0.0052 | 0.0051 | 0.933 | 0.93 | 0.933 | 0.028 | 0.028 | 0.028 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0014 | 0.002 | 0.0013 | 0.958 | 0.937 | 0.931 | 0.005 | 0.005 | 0.005 |


| $T \mathrm{x}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0001 | 0 | -0.0002 | 0.966 | 0.964 | 0.964 | 0.003 | 0.003 | 0.003 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .1; $\rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0014 | -0.0014 | $-0.0015$ | 0.953 | 0.959 | 0.966 | 0.002 | 0.002 | 0.002 |
| Tx $=.1 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=0$ | 0.002 | 0.0016 | 0.002 | 0.958 | 0.968 | 0.998 | 0.001 | 0.001 | 0.001 |
| $\mathrm{Tx}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.001 | -0.0012 | -0.001 | 0.925 | 0.929 | 0.923 | 0.011 | 0.011 | 0.011 |
| $\mathrm{T} x=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.004 | -0.0039 | -0.0039 | 0.939 | 0.934 | 0.936 | 0.008 | 0.008 | 0.008 |
| $\mathrm{T} x=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0045 | -0.0047 | -0.0044 | 0.938 | 0.936 | 0.936 | 0.007 | 0.007 | 0.007 |
| Tx = .1; $\rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.001 | -0.0007 | -0.0009 | 0.936 | 0.941 | 0.942 | 0.006 | 0.006 | 0.006 |
| Tx = .1; $\rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0018 | 0.0022 | 0.0018 | 0.944 | 0.942 | 0.944 | 0.029 | 0.029 | 0.029 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0093 | -0.0093 | -0.0092 | 0.93 | 0.928 | 0.927 | 0.029 | 0.029 | 0.029 |
| $T \mathrm{~T}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0123 | -0.0123 | -0.0123 | 0.931 | 0.929 | 0.929 | 0.029 | 0.029 | 0.029 |
| Tx = . $1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0041 | -0.0043 | -0.0041 | 0.941 | 0.939 | 0.94 | 0.027 | 0.027 | 0.027 |
| Tx = .1; $\rho=0.00 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0012 | -0.002 | -0.0014 | 0.955 | 0.935 | 0.929 | 0.004 | 0.004 | 0.004 |
| Tx $=.1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=0$ | -0.0006 | -0.0006 | -0.0005 | 0.967 | 0.963 | 0.959 | 0.002 | 0.002 | 0.002 |
| Tx $=.1 ; \rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.001 | 0.001 | 0.0012 | 0.966 | 0.97 | 0.974 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.81 ; ~ S S=50 ; S S R=2 ; ~ T 2=0$ | $-0.0005$ | $-0.0005$ | $-0.0005$ | 0.962 | 0.977 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = .1; $\rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0013 | -0.001 | -0.0012 | 0.947 | 0.944 | 0.947 | 0.008 | 0.008 | 0.008 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0005$ | $-0.0006$ | $-0.0005$ | 0.935 | 0.929 | 0.932 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0023 | -0.0023 | -0.0024 | 0.948 | 0.948 | 0.944 | 0.006 | 0.006 | 0.006 |
| Tx = .1; $\rho=0.81 ;$ SS = 50; SSR =2; $\mathrm{T} 2=.1$ | 0.0025 | 0.0019 | 0.0025 | 0.938 | 0.941 | 0.933 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0073 | -0.0072 | $-0.0073$ | 0.924 | 0.924 | 0.924 | 0.031 | 0.031 | 0.031 |
| $\mathrm{Tx}=.1 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0063$ | -0.0063 | $-0.0063$ | 0.939 | 0.937 | 0.94 | 0.026 | 0.026 | 0.026 |
| $\mathrm{Tx}=.1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0053 | -0.0053 | -0.0053 | 0.928 | 0.93 | 0.927 | 0.025 | 0.025 | 0.025 |
| $\mathrm{Tx}=.1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0016 | -0.0018 | -0.0016 | 0.93 | 0.933 | 0.931 | 0.026 | 0.026 | 0.026 |
| Tx $=.1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | -0.0031 | -0.0031 | -0.0032 | 0.966 | 0.927 | 0.938 | 0.003 | 0.003 | 0.003 |
| Tx = .1; $\rho=0.40 ; S S=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.0021 | 0.0022 | 0.0023 | 0.945 | 0.937 | 0.932 | 0.002 | 0.002 | 0.002 |
| Tx = . $1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0014 | 0.0014 | 0.0014 | 0.954 | 0.964 | 0.969 | 0.001 | 0.001 | 0.001 |
| Tx = . $1 ; \rho=0.81 ;$ SS = $100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=0$ | 0.001 | 0.0014 | 0.0011 | 0.94 | 0.958 | 0.994 | 0.001 | 0.001 | 0.001 |
| Tx = . $1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0074 | -0.0071 | $-0.0073$ | 0.936 | 0.935 | 0.936 | 0.008 | 0.008 | 0.008 |
| Tx = .1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0042 | -0.0042 | -0.0043 | 0.94 | 0.943 | 0.942 | 0.006 | 0.006 | 0.006 |
| TX = .1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0008 | -0.0008 | -0.0009 | 0.939 | 0.94 | 0.939 | 0.006 | 0.006 | 0.006 |


| TX = .1; $\rho=0.81 ;$ SS =100; SSR $=1 ; \mathrm{T} 2=.1$ | $-0.0054$ | $-0.0054$ | -0.0054 | 0.935 | 0.925 | 0.935 | 0.006 | 0.006 | 0.006 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T}=.5$ | -0.0053 | -0.0053 | -0.0053 | 0.937 | 0.946 | 0.938 | 0.027 | 0.027 | 0.027 |
| $T \mathrm{X}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0034 | 0.0034 | 0.0034 | 0.927 | 0.924 | 0.928 | 0.027 | 0.027 | 0.027 |
| TX = . $1 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | $-0.0031$ | $-0.0032$ | -0.0031 | 0.947 | 0.947 | 0.945 | 0.025 | 0.025 | 0.025 |
| TX $=.1 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | -0.0093 | $-0.0093$ | -0.0093 | 0.939 | 0.933 | 0.94 | 0.025 | 0.025 | 0.025 |
| TX = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | -0.0008 | -0.0002 | -0.0008 | 0.961 | 0.935 | 0.934 | 0.002 | 0.002 | 0.002 |
| Tx = . $; ~ \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}^{2}=0$ | $-0.0009$ | $-0.0007$ | -0.0008 | 0.957 | 0.952 | 0.947 | 0.001 | 0.001 | 0.001 |
| TX = . $; ~ \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | 0.0006 | 0.0006 | 0.0005 | 0.958 | 0.967 | 0.972 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | $-0.0001$ | -0.0003 | -0.0001 | 0.966 | 0.977 | 0.998 | 0 | 0 | 0 |
| $T \mathrm{~T}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0003 | 0.0004 | 0.0004 | 0.956 | 0.954 | 0.954 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0011 | 0.0011 | 0.0012 | 0.941 | 0.942 | 0.941 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{X}=.1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | $-0.0023$ | $-0.0023$ | -0.0023 | 0.925 | 0.925 | 0.922 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0009 | -0.0008 | -0.0009 | 0.944 | 0.949 | 0.948 | 0.005 | 0.005 | 0.005 |
| $T \mathrm{X}=.1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0047 | -0.0045 | -0.0047 | 0.936 | 0.941 | 0.936 | 0.026 | 0.026 | 0.026 |
| Tx = . $; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | $-0.0024$ | $-0.0024$ | -0.0024 | 0.948 | 0.95 | 0.947 | 0.024 | 0.024 | 0.024 |
| TX = . $; ~ \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=.5$ | -0.007 | -0.007 | -0.007 | 0.923 | 0.922 | 0.923 | 0.027 | 0.027 | 0.027 |
| $T \mathrm{X}=.1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | $-0.0017$ | $-0.0017$ | -0.0017 | 0.924 | 0.923 | 0.925 | 0.027 | 0.027 | 0.027 |
| Tx = . $; ~ \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | $-0.0046$ | -0.0042 | -0.0048 | 0.955 | 0.935 | 0.94 | 0.013 | 0.014 | 0.013 |
| Tx = . $; ~ \rho=0.40 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.001 | 0.0014 | 0.0015 | 0.954 | 0.946 | 0.942 | 0.008 | 0.008 | 0.008 |
| Tx = . $; ~ \rho=0.59 ;$ SS $=20 ; S S R=1 ; ~ T 2=0$ | 0.0025 | 0.003 | 0.0027 | 0.948 | 0.949 | 0.964 | 0.006 | 0.006 | 0.006 |
| Tx = . $; ~ \rho=0.81 ; ~ S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0004 | 0.0001 | -0.0002 | 0.956 | 0.97 | 0.997 | 0.003 | 0.003 | 0.003 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0019 | -0.0022 | -0.0017 | 0.937 | 0.936 | 0.928 | 0.018 | 0.018 | 0.017 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | $-0.0022$ | -0.002 | -0.0019 | 0.932 | 0.933 | 0.928 | 0.013 | 0.013 | 0.013 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0039 | 0.0041 | 0.0045 | 0.937 | 0.943 | 0.939 | 0.011 | 0.011 | 0.011 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0013 | 0.0006 | -0.0003 | 0.939 | 0.931 | 0.954 | 0.008 | 0.008 | 0.008 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0158 | 0.0152 | 0.0154 | 0.94 | 0.941 | 0.943 | 0.038 | 0.038 | 0.038 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0025$ | $-0.0028$ | -0.0027 | 0.923 | 0.924 | 0.93 | 0.033 | 0.033 | 0.032 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0033$ | $-0.0028$ | -0.0031 | 0.942 | 0.944 | 0.943 | 0.029 | 0.029 | 0.029 |
| Tx $=.5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0075 | 0.0083 | 0.0077 | 0.948 | 0.944 | 0.949 | 0.027 | 0.027 | 0.027 |
| Tx = .5; $\rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0045 | $-0.0036$ | -0.004 | 0.967 | 0.939 | 0.944 | 0.008 | 0.009 | 0.008 |

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| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0038 | $-0.0038$ | $-0.0036$ | 0.951 | 0.948 | 0.948 | 0.005 | 0.005 | 0.005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = .5; $\rho=0.59 ;$ SS =20; SSR $=2 ; \mathrm{T} 2=0$ | 0.0017 | 0.0021 | 0.0016 | 0.954 | 0.959 | 0.965 | 0.004 | 0.004 | 0.004 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | -0.001 | -0.0012 | -0.0015 | 0.946 | 0.95 | 0.994 | 0.002 | 0.002 | 0.002 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0004 | 0.0008 | 0.0005 | 0.937 | 0.932 | 0.932 | 0.014 | 0.014 | 0.014 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0038 | $-0.0035$ | -0.0038 | 0.937 | 0.943 | 0.94 | 0.01 | 0.01 | 0.01 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0017 | $-0.0019$ | -0.0018 | 0.941 | 0.934 | 0.938 | 0.008 | 0.008 | 0.008 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=.1$ | -0.0037 | $-0.0037$ | -0.0036 | 0.921 | 0.924 | 0.928 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0021 | -0.0022 | -0.0024 | 0.943 | 0.941 | 0.943 | 0.033 | 0.033 | 0.033 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0036 | 0.0037 | 0.0037 | 0.949 | 0.95 | 0.95 | 0.028 | 0.028 | 0.028 |
| Tx = . $5 ; \rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0007 | 0.0007 | 0.0007 | 0.939 | 0.938 | 0.943 | 0.028 | 0.028 | 0.028 |
| Tx = . $5 ; \rho=0.81 ; \mathrm{SS}=20 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0044 | 0.0045 | 0.0046 | 0.946 | 0.941 | 0.946 | 0.025 | 0.026 | 0.025 |
| Tx = . $5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0002 | -0.0004 | $-0.0001$ | 0.964 | 0.946 | 0.943 | 0.005 | 0.005 | 0.005 |
| Tx = . $5 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0001 | 0.0002 | 0.0003 | 0.959 | 0.951 | 0.941 | 0.003 | 0.003 | 0.003 |
| Tx = . $5 ; \rho=0.59 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0009 | 0.0014 | 0.0012 | 0.966 | 0.971 | 0.977 | 0.002 | 0.002 | 0.002 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ \mathrm{~T} 2=0$ | $-0.0005$ | -0.001 | $-0.0006$ | 0.96 | 0.959 | 0.997 | 0.001 | 0.001 | 0.001 |
| Tx = . $5 ; \rho=0.00 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0036 | 0.0034 | 0.0034 | 0.95 | 0.939 | 0.943 | 0.01 | 0.01 | 0.01 |
| Tx = . $5 ; \rho=0.40 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | 0.0018 | 0.002 | 0.0019 | 0.945 | 0.945 | 0.943 | 0.008 | 0.008 | 0.008 |
| Tx = . $5 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0014 | 0.0014 | 0.0014 | 0.932 | 0.928 | 0.933 | 0.008 | 0.008 | 0.007 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=50 ; S S R=1 ; ~ T 2=.1$ | -0.0014 | -0.0014 | -0.0013 | 0.933 | 0.935 | 0.929 | 0.007 | 0.007 | 0.007 |
| Tx = . $5 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.5$ | 0.0109 | 0.0112 | 0.0108 | 0.951 | 0.953 | 0.953 | 0.028 | 0.028 | 0.028 |
| Tx = . $5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | -0.0031 | -0.0031 | -0.0031 | 0.936 | 0.933 | 0.934 | 0.029 | 0.029 | 0.029 |
| Tx = . $5 ; \rho=0.59 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0001 | 0 | -0.0001 | 0.939 | 0.938 | 0.94 | 0.028 | 0.028 | 0.028 |
| Tx = . $5 ; \rho=0.81 ; ~ S S=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | -0.0021 | -0.002 | -0.0021 | 0.947 | 0.944 | 0.945 | 0.025 | 0.025 | 0.025 |
| Tx = . $5 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=0$ | 0.0035 | 0.0035 | 0.0034 | 0.954 | 0.92 | 0.933 | 0.004 | 0.004 | 0.004 |
| Tx = . $5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0023 | 0.0024 | 0.0024 | 0.949 | 0.938 | 0.936 | 0.002 | 0.002 | 0.002 |
| Tx = . $5 ; \rho=0.59 ;$ SS = 50; SSR $=2 ; ~ \mathrm{~T} 2=0$ | 0 | -0.0002 | $-0.0002$ | 0.959 | 0.966 | 0.969 | 0.001 | 0.001 | 0.001 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0002 | 0.0001 | -0.0003 | 0.949 | 0.957 | 0.996 | 0.001 | 0.001 | 0.001 |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0021 | 0.002 | 0.002 | 0.938 | 0.936 | 0.936 | 0.008 | 0.008 | 0.008 |
| Tx = . $5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.003 | $-0.0029$ | -0.003 | 0.94 | 0.94 | 0.94 | 0.007 | 0.007 | 0.007 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | -0.0051 | -0.005 | -0.0051 | 0.934 | 0.93 | 0.933 | 0.007 | 0.007 | 0.007 |


| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.002 | 0.0022 | 0.0019 | 0.929 | 0.932 | 0.928 | 0.006 | 0.006 | 0.006 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{Tx}=.5 ; \rho=0.00 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0069 | 0.0069 | 0.0069 | 0.94 | 0.938 | 0.939 | 0.029 | 0.029 | 0.029 |
| $\mathrm{Tx}=.5 ; \rho=0.40 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0035 | 0.0035 | 0.0035 | 0.947 | 0.946 | 0.945 | 0.024 | 0.024 | 0.024 |
| $\mathrm{Tx}=.5 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0031 | -0.0031 | -0.0031 | 0.927 | 0.928 | 0.928 | 0.026 | 0.026 | 0.026 |
| $\mathrm{Tx}=.5 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0027 | $-0.0027$ | -0.0027 | 0.944 | 0.943 | 0.944 | 0.024 | 0.024 | 0.024 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | -0.002 | $-0.0016$ | -0.0018 | 0.956 | 0.927 | 0.928 | 0.003 | 0.003 | 0.003 |
| TX = .5; $\rho=0.40 ;$ SS = 100; SSR $=1 ; \mathrm{T}_{2}=0$ | 0.0017 | 0.0016 | 0.0016 | 0.955 | 0.955 | 0.948 | 0.002 | 0.002 | 0.002 |
| TX = .5; $\rho=0.59 ; \mathrm{SS}=100 ;$ SSR $=1 ; \mathrm{T} 2=0$ | 0.0004 | 0.0005 | 0.0004 | 0.959 | 0.964 | 0.977 | 0.001 | 0.001 | 0.001 |
| $\mathrm{TX}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T2}=0$ | -0.0004 | -0.0004 | -0.0004 | 0.959 | 0.965 | 0.99 | 0.001 | 0.001 | 0.001 |
| $\mathrm{TX}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0019 | -0.0018 | -0.0019 | 0.951 | 0.948 | 0.948 | 0.007 | 0.007 | 0.007 |
| $\mathrm{TX}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.0016 | -0.0015 | -0.0016 | 0.943 | 0.943 | 0.943 | 0.007 | 0.007 | 0.007 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | 0.0014 | 0.0015 | 0.0015 | 0.935 | 0.937 | 0.935 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ; S S R=1 ; ~ T 2=.1$ | 0.0049 | 0.0047 | 0.0049 | 0.937 | 0.937 | 0.938 | 0.006 | 0.006 | 0.006 |
| $T \mathrm{~T}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0047 | 0.0045 | 0.0047 | 0.944 | 0.942 | 0.943 | 0.025 | 0.025 | 0.025 |
| TX = .5; $\rho=0.40 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0012 | 0.0012 | 0.0012 | 0.912 | 0.914 | 0.915 | 0.028 | 0.028 | 0.028 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=1 ; ~ T 2=.5$ | 0.0107 | 0.0107 | 0.0107 | 0.927 | 0.928 | 0.929 | 0.027 | 0.027 | 0.027 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0029 | 0.0027 | 0.0029 | 0.94 | 0.941 | 0.939 | 0.024 | 0.024 | 0.024 |
| TX $=.5 ; \rho=0.00 ;$ SS $=100 ; S S R=2 ; ~ T 2=0$ | -0.0029 | -0.003 | -0.0029 | 0.948 | 0.927 | 0.923 | 0.002 | 0.002 | 0.002 |
| Tx = . $; ~ \rho \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=0$ | 0.0009 | 0.0007 | 0.0009 | 0.947 | 0.94 | 0.937 | 0.001 | 0.001 | 0.001 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}_{2}=0$ | -0.0011 | -0.001 | -0.0012 | 0.955 | 0.959 | 0.967 | 0.001 | 0.001 | 0.001 |
| $T \mathrm{~T}=.5 ; \rho=0.81 ; \mathrm{SS}=100 ;$ SSR $=2 ; \mathrm{T} 2=0$ | -0.0009 | -0.001 | -0.0009 | 0.957 | 0.975 | 0.998 | 0 | 0 | 0 |
| TX $=.5 ; \rho=0.00 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0014 | 0.0015 | 0.0014 | 0.936 | 0.936 | 0.936 | 0.007 | 0.007 | 0.007 |
| TX $=.5 ; \rho=0.40 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T}^{2}=.1$ | -0.0028 | $-0.0028$ | -0.0028 | 0.936 | 0.937 | 0.934 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ; S S R=2 ; ~ T 2=.1$ | -0.0017 | $-0.0017$ | -0.0017 | 0.941 | 0.942 | 0.942 | 0.006 | 0.006 | 0.006 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ;$ SSR $=2 ; \mathrm{T} 2=.1$ | -0.0066 | $-0.0063$ | -0.0065 | 0.94 | 0.943 | 0.938 | 0.005 | 0.005 | 0.005 |
| $T \mathrm{X}=.5 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | -0.0072 | -0.0074 | -0.0071 | 0.942 | 0.943 | 0.942 | 0.026 | 0.026 | 0.026 |
| $T \mathrm{~T}=.5 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0001 | 0.0001 | 0.0001 | 0.943 | 0.943 | 0.944 | 0.024 | 0.024 | 0.024 |
| TX $=.5 ; \rho=0.59 ;$ SS $=100 ;$ SSR $=2 ; ~ T 2=.5$ | 0.0036 | 0.0036 | 0.0036 | 0.934 | 0.934 | 0.934 | 0.025 | 0.025 | 0.025 |
| TX $=.5 ; \rho=0.81 ;$ SS $=100 ; S S R=2 ; ~ T 2=.5$ | -0.0055 | $-0.0056$ | -0.0055 | 0.936 | 0.934 | 0.938 | 0.024 | 0.024 | 0.024 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0075 | 0.0072 | 0.0073 | 0.959 | 0.938 | 0.937 | 0.012 | 0.013 | 0.012 |


| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=0$ | 0.0034 | 0.0026 | 0.0031 | 0.948 | 0.948 | 0.943 | 0.008 | 0.008 | 0.008 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.59 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T}=0$ | 0.0032 | 0.0026 | 0.0027 | 0.958 | 0.961 | 0.97 | 0.005 | 0.005 | 0.005 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; ~ T 2=0$ | 0.0004 | 0.0009 | -0.0001 | 0.956 | 0.96 | 0.995 | 0.003 | 0.003 | 0.003 |
| Tx = 1; $\rho=0.00 ;$ SS =20; SSR $=1 ; \mathrm{T} 2=.1$ | 0.0003 | 0.0008 | 0.0002 | 0.917 | 0.918 | 0.913 | 0.019 | 0.02 | 0.019 |
| Tx = 1; $\rho=0.40 ;$ SS $=20 ;$ SSR $=1 ; ~ \mathrm{~T}=.1$ | -0.004 | -0.0039 | -0.0034 | 0.937 | 0.935 | 0.931 | 0.012 | 0.012 | 0.012 |
| TX = 1; $\rho=0.59 ; \mathrm{SS}=20 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | -0.004 | -0.0036 | -0.0042 | 0.942 | 0.94 | 0.937 | 0.011 | 0.011 | 0.011 |
| TX $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=1 ; \mathrm{T} 2=.1$ | -0.0017 | -0.001 | -0.0017 | 0.935 | 0.935 | 0.947 | 0.008 | 0.008 | 0.008 |
| TX $=1 ; \rho=0.00 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0074 | -0.0079 | -0.0082 | 0.937 | 0.932 | 0.931 | 0.038 | 0.038 | 0.038 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0049 | -0.0047 | -0.0049 | 0.942 | 0.941 | 0.938 | 0.031 | 0.031 | 0.031 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=1 ; ~ T 2=.5$ | -0.0063 | -0.0063 | -0.0064 | 0.946 | 0.944 | 0.942 | 0.03 | 0.03 | 0.03 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ; S S R=1 ; ~ T 2=.5$ | $-0.0085$ | -0.0081 | -0.0085 | 0.94 | 0.934 | 0.935 | 0.027 | 0.028 | 0.028 |
| Tx $=1 ; \rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0003 | 0.0005 | -0.0005 | 0.951 | 0.927 | 0.937 | 0.009 | 0.01 | 0.009 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.0048 | 0.0052 | 0.0049 | 0.951 | 0.946 | 0.949 | 0.006 | 0.006 | 0.006 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=0$ | 0.001 | 0.0008 | 0.0011 | 0.946 | 0.953 | 0.959 | 0.004 | 0.004 | 0.004 |
| TX $=1 ; \rho=0.81 ; ~ S S=20 ; S S R=2 ; ~ T 2=0$ | -0.0007 | -0.0019 | -0.0004 | 0.954 | 0.967 | 0.996 | 0.002 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.00 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | 0.0066 | 0.0073 | 0.0069 | 0.932 | 0.93 | 0.927 | 0.014 | 0.014 | 0.014 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.003 | 0.0028 | 0.0025 | 0.949 | 0.951 | 0.946 | 0.01 | 0.01 | 0.01 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.1$ | 0.0003 | 0.0004 | 0.0001 | 0.936 | 0.934 | 0.935 | 0.009 | 0.009 | 0.009 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.1$ | $-0.0034$ | -0.0039 | -0.003 | 0.933 | 0.926 | 0.931 | 0.007 | 0.008 | 0.007 |
| TX = 1; $\rho=0.00 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | 0.0009 | 0.0004 | 0.0008 | 0.943 | 0.936 | 0.941 | 0.033 | 0.033 | 0.033 |
| Tx $=1 ; \rho=0.40 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.0002 | 0.0001 | 0.0001 | 0.929 | 0.934 | 0.934 | 0.031 | 0.031 | 0.031 |
| Tx $=1 ; \rho=0.59 ; S S=20 ; S S R=2 ; ~ T 2=.5$ | -0.001 | -0.0012 | -0.0009 | 0.949 | 0.944 | 0.946 | 0.029 | 0.029 | 0.029 |
| Tx $=1 ; \rho=0.81 ;$ SS $=20 ;$ SSR $=2 ; ~ T 2=.5$ | -0.002 | -0.0025 | -0.0024 | 0.929 | 0.928 | 0.927 | 0.029 | 0.029 | 0.029 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=0$ | $-0.0003$ | -0.0003 | -0.0001 | 0.941 | 0.918 | 0.925 | 0.006 | 0.006 | 0.005 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=1 ; ~ T 2=0$ | -0.0034 | -0.0035 | -0.0037 | 0.959 | 0.957 | 0.952 | 0.003 | 0.003 | 0.003 |
| Tx $=1 ; \rho=0.59 ; S S=50 ; S S R=1 ; ~ T 2=0$ | 0.0027 | 0.0022 | 0.0024 | 0.957 | 0.963 | 0.968 | 0.002 | 0.002 | 0.002 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0002 | 0.0001 | 0.0001 | 0.961 | 0.962 | 0.995 | 0.001 | 0.001 | 0.001 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=1 ; ~ T 2=.1$ | 0.0007 | 0.0007 | 0.0007 | 0.934 | 0.931 | 0.932 | 0.01 | 0.011 | 0.01 |
| Tx = 1; $\rho=0.40 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0009 | -0.0009 | -0.001 | 0.949 | 0.946 | 0.949 | 0.008 | 0.008 | 0.008 |
| Tx $=1 ; \rho=0.59 ; S S=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.1$ | -0.0021 | -0.0021 | -0.0022 | 0.943 | 0.945 | 0.947 | 0.007 | 0.007 | 0.007 |


| Tx $=1 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=1 ; ~ \mathrm{~T}=.1$ | -0.002 | -0.0017 | -0.0021 | 0.931 | 0.929 | 0.928 | 0.006 | 0.006 | 0.006 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TX $=1 ; \rho=0.00 ; S S=50 ;$ SSR $=1 ; \mathrm{T} 2=.5$ | -0.0002 | -0.0004 | -0.0002 | 0.924 | 0.92 | 0.922 | 0.033 | 0.033 | 0.033 |
| Tx $=1 ; \rho=0.40 ; S S=50 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.0035 | 0.0036 | 0.0036 | 0.937 | 0.936 | 0.938 | 0.028 | 0.028 | 0.028 |
| Tx $=1 ; \rho=0.59 ;$ SS = 50; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | $-0.0066$ | -0.0066 | $-0.0065$ | 0.935 | 0.932 | 0.936 | 0.027 | 0.027 | 0.027 |
| TX = 1; $\rho=0.81 ;$ SS $=50 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0032 | 0.0033 | 0.0032 | 0.926 | 0.923 | 0.925 | 0.026 | 0.026 | 0.026 |
| TX $=1 ; \rho=0.00 ;$ SS $=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0017 | 0.0015 | 0.0017 | 0.957 | 0.936 | 0.93 | 0.004 | 0.004 | 0.004 |
| TX $=1 ; \rho=0.40 ;$ SS $=50 ; S S R=2 ; \mathrm{T} 2=0$ | 0.0005 | 0.0007 | 0.0005 | 0.964 | 0.955 | 0.955 | 0.002 | 0.002 | 0.002 |
| TX $=1 ; \rho=0.59 ; \mathrm{SS}=50 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0008 | 0.0006 | 0.0007 | 0.943 | 0.947 | 0.961 | 0.002 | 0.002 | 0.002 |
| TX $=1 ; \rho=0.81 ;$ SS $=50 ;$ SSR $=2 ; ~ \mathrm{~T} 2=0$ | 0 | 0 | 0 | 0.944 | 0.966 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx $=1 ; \rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0028 | 0.0025 | 0.0027 | 0.934 | 0.935 | 0.935 | 0.009 | 0.009 | 0.008 |
| Tx $=1 ; \rho=0.40 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | 0.0016 | 0.0018 | 0.0018 | 0.932 | 0.931 | 0.935 | 0.007 | 0.007 | 0.007 |
| Tx $=1 ; \rho=0.59 ; S S=50 ;$ SSR $=2 ; ~ T 2=.1$ | $-0.0007$ | -0.0007 | $-0.0008$ | 0.928 | 0.925 | 0.926 | 0.006 | 0.006 | 0.006 |
| Tx $=1 ; \rho=0.81 ; S S=50 ; S S R=2 ; ~ T 2=.1$ | -0.0007 | -0.0005 | $-0.0007$ | 0.93 | 0.932 | 0.928 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.00 ; S S=50 ; S S R=2 ; ~ T 2=.5$ | -0.0032 | -0.0033 | -0.0032 | 0.926 | 0.925 | 0.927 | 0.029 | 0.029 | 0.029 |
| Tx $=1 ; \rho=0.40 ; S S=50 ;$ SSR $=2 ; ~ T 2=.5$ | $-0.0014$ | -0.0014 | -0.0013 | 0.936 | 0.935 | 0.937 | 0.027 | 0.027 | 0.027 |
| Tx = 1; $\rho=0.59 ;$ SS = 50; SSR $=2 ; \mathrm{T} 2=.5$ | 0.0042 | 0.0042 | 0.0042 | 0.925 | 0.926 | 0.925 | 0.027 | 0.027 | 0.027 |
| Tx = 1; $\rho=0.81 ;$ SS = 50; SSR $=2 ; ~ T 2=.5$ | 0.0044 | 0.0044 | 0.0044 | 0.942 | 0.939 | 0.941 | 0.025 | 0.025 | 0.025 |
| Tx $=1 ; \rho=0.00 ; S S=100 ; S S R=1 ; ~ T 2=0$ | $-0.0015$ | -0.0019 | -0.0015 | 0.96 | 0.941 | 0.94 | 0.002 | 0.003 | 0.002 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0019 | -0.0019 | -0.002 | 0.961 | 0.964 | 0.955 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | -0.0011 | -0.0009 | -0.001 | 0.96 | 0.965 | 0.972 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=0$ | 0.0007 | 0.0009 | 0.0008 | 0.95 | 0.969 | 0.999 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0046 | 0.005 | 0.0047 | 0.931 | 0.933 | 0.935 | 0.008 | 0.008 | 0.008 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | 0.0017 | 0.0017 | 0.0018 | 0.947 | 0.946 | 0.948 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.1$ | $-0.0012$ | -0.0012 | -0.0011 | 0.932 | 0.931 | 0.934 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.81 ;$ SS = $100 ;$ SSR $=1 ; ~ T 2=.1$ | 0.0013 | 0.0013 | 0.0013 | 0.931 | 0.935 | 0.931 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.00 ;$ SS $=100 ;$ SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0 | 0 | 0 | 0.93 | 0.927 | 0.931 | 0.029 | 0.029 | 0.029 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | $-0.0023$ | -0.0023 | -0.0024 | 0.914 | 0.912 | 0.914 | 0.029 | 0.029 | 0.029 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=1 ; \mathrm{T} 2=.5$ | 0.0092 | 0.0092 | 0.0092 | 0.934 | 0.935 | 0.934 | 0.027 | 0.027 | 0.027 |
| Tx = 1; $\rho=0.81 ;$ SS = 100; SSR $=1 ; ~ \mathrm{~T} 2=.5$ | 0.007 | 0.007 | 0.007 | 0.945 | 0.942 | 0.943 | 0.025 | 0.025 | 0.025 |
| $T \mathrm{x}=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0001 | 0.0001 | -0.0003 | 0.958 | 0.928 | 0.932 | 0.002 | 0.002 | 0.002 |


| T $\mathrm{L}=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | -0.0005 | -0.0005 | -0.0004 | 0.965 | 0.96 | 0.957 | 0.001 | 0.001 | 0.001 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=0$ | 0.0002 | 0.0003 | 0.0002 | 0.96 | 0.961 | 0.97 | 0.001 | 0.001 | 0.001 |
| Tx = 1; $\rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{t} 2=0$ | 0.0001 | 0.0002 | 0 | 0.955 | 0.966 | 0.999 | 0 | 0 | 0 |
| Tx = 1; $\rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{r} 2=.1$ | 0.0027 | 0.0025 | 0.0027 | 0.933 | 0.931 | 0.932 | 0.007 | 0.007 | 0.007 |
| Tx = 1; $\rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{r} 2=.1$ | 0.0037 | 0.0037 | 0.0037 | 0.937 | 0.937 | 0.937 | 0.006 | 0.006 | 0.006 |
| Tx = 1; $\rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{r} 2=.1$ | -0.0012 | -0.0011 | -0.0012 | 0.936 | 0.935 | 0.938 | 0.006 | 0.006 | 0.006 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.1$ | 0.0037 | 0.004 | 0.0037 | 0.94 | 0.938 | 0.939 | 0.005 | 0.005 | 0.005 |
| Tx $=1 ; \rho=0.00 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0005 | 0.0005 | 0.0005 | 0.933 | 0.931 | 0.933 | 0.027 | 0.027 | 0.027 |
| TX $=1 ; \rho=0.40 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0028 | 0.0029 | 0.0028 | 0.936 | 0.936 | 0.939 | 0.023 | 0.023 | 0.023 |
| $T \mathrm{~T}=1 ; \rho=0.59 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0021 | 0.002 | 0.0021 | 0.935 | 0.936 | 0.936 | 0.026 | 0.026 | 0.026 |
| Tx $=1 ; \rho=0.81 ; \mathrm{SS}=100 ; \mathrm{SSR}=2 ; \mathrm{T} 2=.5$ | 0.0017 | 0.0017 | 0.0018 | 0.928 | 0.928 | 0.926 | 0.026 | 0.026 | 0.026 |

## Appendix C. Included Studies

Articles 1-66 are from ClinicalTrials.gov. Articles 67-127 are from Tufts' network drives from previous systematic reviews.
(1) Alexandre B. Comparison of Insulin Detemir and NPH Insulin Given Once Daily in Ageing Subjects With Type 2 Diabetes (3L) In: ClinicalTrials.gov.
http://clinicaltrials.gov/ct2/show/NCT00506662?term=NCT00506662\&rank=1 NLM Identifier: NCT00506662 . 2012. Bethesda MD, National Library of Medicine (U.S.). 2-25-2012. Ref Type: Online Source
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[^0]:    ${ }^{\mathrm{a}}$ However, this is to be verified empirically.

[^1]:    o We excluded median values, interquartile ranges, full ranges, and P values. For the purposes of this exercise, we considered P values to be an insufficiently accurate estimate of the within-group SE for calculating $r$. We initially planned to include studies that reported exact P values with at least 2 significant digits (e.g., 0.75 or 0.0036 ), however, we decided that large P values were not sufficiently precise to accurately estimate $r$ and we were also concerned that the large

[^2]:    b The correlation coefficient can be shown to have range $=[-1,1]$ because of the Cauchy-Schwarz inequality. 3,4
    c The Fisher z-transformation of variable $r$ is $z(r)=\frac{1}{2} \ln \left(\frac{1+r}{1-r}\right)=\operatorname{atanh}(r)$. This is a variance-stabilizing transformation for the estimated correlation coefficient. Atanh = inverse hyperbolic tangent.

[^3]:    ${ }^{d}$ Recall that a value of 0.59 will result in $50 \%$ of the within-group SEs to be overestimated and $50 \%$ to be underestimated.

[^4]:    ${ }^{e}$ Recall that we arbitrarily selected pairs of groups from each study and that some studies contributed several groups to analyses of within-group change. Therefore, use of the median of the overall distribution of correlation values is not guaranteed to "balance" underestimation and overestimation in the net change analyses).

[^5]:    f. Recall that for each treatment arm, $S E_{\text {change within-arm }}=\sqrt{S E_{\text {Final }}^{2}+S E_{\text {Baseline }}^{2}-2 \times r \times S E_{\text {Final } \times} S E_{\text {Baseline }}}$
    g. Recall that for treatments A and $\mathrm{B}, S E_{\text {NetChange }}=\sqrt{S E_{A}{ }^{2}+S E_{B}}{ }^{2}$, where $S E_{A}$ and $S E_{B}$ are the standard errors of the withinarm change for arms A and B, respectively.

[^6]:    ${ }^{\mathrm{h}}$ Random allocation to treatment groups implies that the average treatment effect is equal to the difference in the post-treatment values between the treated and control groups. In the absence of confounding, adjustment for the baseline values is useful to improve statistical efficiency. Improvement occurs because the pretreatment value "carries information" about the post-treatment measurement (when the correlation is not exactly zero).

