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ESTIMATING PEAK FLOW CHARACTERISTICS AT UNGAGED SITES BY RIDGE REGRESSION

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ABSTRACT

A regression simulation model is combined with a multisite streamflow generator to simulate a regional regression of 50-year peak discharge against a set of basin characteristics. Monte Carlo experiments are used to compare the unbiased ordinary lease squares parameter estimator with Hoerl and Kennard's (1970a) ridge estimator in which the biasing parameter is that proposed by Hoerl, Kennard, and Baldwin (1975). The simulation results indicate a substantial improvement in parameter estimation using ridge regression when the correlation between basin characteristics is more than about 0.90. In addition, results indicate a strong potential for improving the mean square error of prediction of a peak-flow characteristic versus basin characteristics regression model when the basin characteristics are approximately colinear. The simulation covers a range of regression parameters, streamflow statistics, and basin characteristics commonly found in regional regression studies.

INTRODUCTION

Hydrologists are often called upon to estimate peak flow characteristics at stream sites where little or no peak flow information is available. One method frequently used to make such estimates is to relate peak flow characteristics to basin characteristics through a multiple linear regression model. Sample estimates of the parameters of the regression model are made using peak flow and basin characteristic data collected at gaging stations in the region. In situations where the basin characteristics (independent variables) are nearly uncorrelated with each other, the usual least squares regression analysis provides reasonable results. However, if the basin characteristics are highly correlated with each other, the results are less satisfactory.

A biased parameter estimation technique--ridge regression--has been developed by Hoerl and Kennard (1970a) to eliminate some of the problems associated with highly correlated independent variables in a regression problem. The purpose of this study is to test the ridge regression technique in a practical hydrologic regression problem.

Use of Multiple Linear Regression in Hydrology

Regional analysis of streamflow characteristics with a multiple linear regression of flow characteristics on basin characteristics has been used by hydrologists to predict flow characteristics at ungaged sites (Thomas and Benson, 1970) and to improve predictions of flow characteristics at gaged sites (Benson and Matalas, 1967). In addition, some applications of regression analysis rely on individual parameter estimates to infer cause-effect relationships between basin characteristics and flow characteristics (Espey and Winslow, 1974). The power of the linear regression model for these applications depends on the underlying assumption that the basin characteristics are not strongly interrelated. The main consequences of strongly interrelated basin characteristics are the following: 1) The precision of estimation of the regression coefficients decreases so that it may be impossible to infer from the model the relative influence of various basin characteristics. 2) Estimates of coefficients become very sensitive to particular sets of sample data. That is, the set of coefficients estimated from sample data collected at gaging stations in an area may be very much different from the coefffficients that should be applied to ungaged sites.

3) Investigators may be led to drop important variables from the analysis because their coefficients are not significantly different from zero.

The condition of strongly interrelated basin characteristics is referred to as the problem of multicolinearity. Multicolinearity is a condition of deficient data rather than an error in the regression model. It cannot be uncovered by an analysis of residuals. The following is a brief discussion of the problem of multicolinearity.

The Problem of Multicolinearity

Let X_{jp} denote the pth basin characteristic at the jth station. The basin characteristics are linearly dependent if there exist non-zero constants $a_1, a_2, \ldots, a_m$ such that

$$\sum_{p=1}^{m} a_p X_{jp} = 0 \qquad \text{for } j = 1,2,\ldots,N$$

where N is the number of gaging stations in the streamflow network. Multicolinearity is said to exist when the above condition for linear dependence approximately holds.

The problem of multicolinearity in a particular dataset is not easy to detect. Perhaps the best means of detecting the problem is to compute a measure of the precision with which a regression is estimated. The precision of a regression coefficient is estimated by its variance which is proportional to the variance of the error term in the regression model. The constant of proportionality for a standard linear model is termed by Marquardt (1970) the variance inflation factor (VIF). The VIF for the pth regression coefficient b_p is $[1-R_p^2]^{-1}$, where R_p^2 is the coefficient of multiple determination from the regression of the pth basin characteristic on all other basin characteristics in the equation. As R_p^2 approaches 1, indicating a very strong linear dependence between the basin characteristics, the VIF approaches infinity.

As R_p^2 approaches 0, indicating complete orthogonality of the set of basin characteristics, the VIF approaches 1. A VIF of five or more is an indication of possible problems caused by multicolinearity (Montgomery, 1979).

Resolving Difficulties of Multicolinearity

When multicolinearity problems are recognized in a regional hydrologic regression they are usually handled by variable selection. That is, potential variables involved in a multicolinearity are not included in the model so that the problem does not arise. This will happen when a technique such as stepwise regression (Draper and Smith, 1966) is used. Variable selection implies a logic in which a basin characteristic must either be important or unimportant. Eliminating "unimportant" basin characteristics from the model can cause large prediction errors if the eliminated characteristics are, in fact, good predictors of the streamflow characteristic.

Hoerl and Kennard (1970a,b) proposed an alternative to variable selection to control the problem of multicolinearity. The procedure was introduced earlier by Hoerl (1962) and termed "ridge regression" because of its mathematical similarity to a graphical technique called "ridge analysis". Ridge regression amounts to adding a small constant $k[0 \leq k \leq 1]$ to the diagonal of the sample correlation matrix among basin characteristics before inverting it for ordinary least squares estimation. The ridge estimators are biased, but they have the potential to produce more precise estimates of the regression coefficients and smaller prediction errors.

The possibility of obtaining improved precision with a small loss of accuracy makes ridge regression a potentially attractive alternative to ordinary least squares. Unfortunately, there is no completely objective way for deciding whether to use ordinary least squares regression methods or ridge regression methods because such a comparison depends on the true but unknown values of the regression coefficients. This has led many investigators to Monte Carlo experiments in order to gain insight into the performance of the ridge estimators.

Previous Studies

The problem of multicolinearity is discussed by Johnston (1972), Mason, Gunst, and Webster (1975), Marquardt and Snee (1975), and Chatterjee and Price (1977). Interest in Hoerl and Kennard's class of biased estimators called ridge estimators is evident from the growing literature on the subject, [Marquardt, 1970, Mayer and Willke, 1973, Theobald, 1974, Hocking, Speed, and Lynn, 1976, Vinod, 1976a,b, Farebrother, 1978, Baldwin and Hoerl, 1978, and Golub, Heath, and Wahba, 1979]. Hsiang (1975), Rolph (1976), and Oman (1978) provide a bayesian interpretation of the ridge estimators. Conniffe and Stone (1973), and Draper and Van Nostrand, (1979), have been critical of ridge regression. Much of the recent literature concerns Monte Carlo studies to determine sampling properties of various ridge biasing parameters [Hoerl, Kennard, and Baldwin, 1975, McDonald and Galarneau, 1975, Hoerl and Kennard, 1976, Lawless and Wang, 1976, Dempster, Schatzoff and Wermuth, 1977, Carmer and Hsieh, 1978, Swamy, Mehta, and Rappoport, 1978, Vinod, 1978, Wichern and Churchill, 1978, Hemmerle, and Brantle, 1978, Lawless, 1978, and Peele and Ryan, 1979]. Smith, Anderson, and Scott (1973), Anderson and Scott (1974), and Kitanidis and Bras (1978) have applied ridge regression methods to hydrologic problems.

Purpose and Scope

The purpose of this report is to compare the ordinary least squares estimator with an operational ridge estimator of regression parameters for a linear regression model of peak flow characteristics on basin characteristics. The term operational ridge estimator refers to the fact that the biasing parameters, k, is estimated from sample data, and thus, can be applied to a practical problem. The comparison uses Monte Carlo experiments to simulate regional hydrologic regression problems that cover a range of situations likely to occur in practice. This simulation differs from earlier ones in that it simulates a specific regression problem--a regional regression of peak discharge characteristics on basin characteristics. In such regressions the regression error term is made up of a sampling error for the peak discharge characteristic and a model error (Matalas and Gilroy, 1968). The simulation in this study follows the general scheme of Moss and Karlinger (1974), who combined a regression simulator with a multisite synthetic streamflow generator in order to account for these two sources of error in a streamflow network design study.

The mathematical background of regional hydrologic regression, ordinary least squares and ridge estimation, and an operational biasing parameter are given in the next section. This background is followed by sections on simulation description, Monte Carlo experimental design, performance measures, and experimental results. The summary and conclusions section is followed by a list of references, notations, a table of results (Appendix A), the computer program listing (Appendix B), and a note on generating correlated uniform random numbers (Appendix C).

Acknowledgement

The author wishes to express appreciation to Dr. Jared Cohon, Johns Hopkins University, for his constructive suggestions which were most helpful in improving this report. This report was submitted to the Johns Hopkins University in conformity with the requirements for the degree of Master of Science.

MATHEMATICAL BACKGROUND

Regression Model of T-Year Peak Discharge

Let z_{ij} denote the ith observation of the logarithm of annual peak discharge at the jth station, where $i = 1,2,\ldots,n_j$ and $j = 1,2,\ldots,N$. Based on the n_j observations, the estimate of the logarithm of the T-year peak discharge at the jth station is denoted by y_j. Following the procedures recommended by the Water Resources Council (1977) the estimate y_j is expressed by

$$y_j = \bar{z}_j + k_T s_j \qquad \text{for } j = 1,2,\ldots,N$$

where

$$\bar{z}_j = 1/n_j \sum_{i=1}^{n} z_{ij}, \tag{1}$$

$$s_j = \left(\frac{1}{n_j-1} \sum_{i=1}^{n} (z_{ij} - \bar{z}_j)^2\right)^{\frac{1}{2}} \quad \text{and} \tag{2}$$

k_T is the standardized Pearson Type III deviate from Harter's (1969) tables for probability 1/T and weighted skew coefficient $\hat{g}_j$. Weighted skew $\hat{g}_j$ is given by

$$\hat{g}_j = \begin{cases} \bar{g}_j, & \text{if } n_j \leq 25 \\ g_j \left[\frac{n_j-25}{75}\right] + \bar{g}_j \left[1-\frac{n_j-25}{75}\right], & \text{if } 25<n_j<100 \\ g_j, & \text{if } n_j \geq 100 \end{cases} \tag{3}$$

where $\bar{g}_j$ is the generalized skew coefficient obtained from a map or from a regional analysis of long-term gages, and g_j is the sample skew given by

$$g_j = \left(\frac{n_j}{(n_j-2)(n_j-1)s_j^3}\right) \sum_{i=1}^{n_j} (z_{ij} - \bar{z}_j)^3 .$$

Assuming y_j is statistically unbiased and consistent, the estimate y_j may be written

$$y_j = E(y_j) + \varepsilon_j \qquad (4)$$

where $E(y_j)$ is the expected value of y_j, ε_j is a random variable zero mean and variance proportional to σ_j^2/n_j, and σ_j^2 is the variance of z_{ij}'s (Bobée, 1973).

Let X_{jp}, $p = 1,2,\ldots,M$, denote the pth basin characteristic associated with the jth station. The relationship between $E(y_j)$ and the X_{jp}'s is formulated as a linear model

$$E(y_j) = \beta_0 + \sum_{p=1}^{M} \beta_p X_{jp} + \partial_j \qquad j=1,2,\ldots,N$$

where β_0 and the β_p's are constants, and ∂_j is a random disturbance which measures the discrepancy in the linear approximation between $E(y_j)$ and the X_{jp}'s. From equation 4,

$$y_j = \beta_0 + \sum_{p=1}^{M} \beta_p X_{jp} + \partial_j + \varepsilon_j \qquad j=1,2,\ldots,N. \qquad (5)$$

Assumptions of Classical Regression

Three assumptions are made in accordance with classical regression analysis. (1) The X_{j1}, X_{j2}, ..., X_{jM} are assumed to be fixed variables. (2) For any set of basin characteristics, X_{j1}, X_{j2}, ..., X_{jM}, the variance of y_j is the same. This requires the variance of $(\partial_j + \varepsilon_j)$ to be the same for all j's. Homoscedasticity in ∂ is assumed to exist. Homoscedasticity in ε requires that σ_j^2/n_j be a constant for all j's. (3) The y_j's associated with the given set $\{X_j, X_j, \ldots, X_{jM}\}$ are normally and independently distributed. Normality is needed for tests of significance and confidence limits. The assumption of independence requires the annual peak flows at different stations to be uncorrelated. This assumption is generally not valid where annual peaks result from large general storms rather than very localized thunderstorms.

Estimating Regression Parameters

In practice it is convenient to have the regression equation in non-standard form

$$\underline{Y} = \underline{J}\beta_0 + \underline{X\beta} + \underline{e}$$

in which $\underline{Y}$ is an N x 1 vector of observations on the dependent variable, $\underline{J}$ is a N x 1 vector of 1's, $\underline{X}$ is an N x M matrix of observations on basin characteristics, β_0 is parameter to be estimated, $\underline{\beta}$ is a m x 1 vector of parameters to be estimated, and $\underline{e}$ is an N x 1 vector of disturbances. It is assumed that $E(\underline{e}) = 0$ and $E(\underline{ee}') = \sigma^2 I$. The objective is to estimate β_0 and β. However, for the regression computations some form of standardization is desirable (Marquardt and Snee, 1975, Vinod, 1978). Let $\underline{U}$ and $\underline{V}$ denote a unit length standardization of $\underline{X}$ and $\underline{Y}$, so that

$$v_j = (y_j - \bar{y})/S_y \qquad \text{for all } j$$

$$\bar{y} = \frac{1}{N} \sum_{j=1}^{N} y_i$$

$$S_y = [\sum_{j=1}^{N} (y_j - \bar{y})^2]^{\frac{1}{2}}$$

$$u_{jp} = (X_{jp} - \bar{X}_p)/S_p \qquad \text{for all } j \text{ and } p$$

$$\bar{X}_p = \frac{1}{N} \sum_{j=1}^{N} X_{jp} \qquad \text{for all } p$$

$$S_p = [\sum_{j=1}^{N} (X_{jp} - \bar{X}_p)^2]^{\frac{1}{2}} \qquad \text{for all } p$$

The standard linear model is

$$\underline{V} = \underline{U}\,\underline{\alpha} + \underline{e}$$

where $\underline{e}$ is a N x 1 vector of disturbances $(\varepsilon_j + \partial_j)$, $\underline{\alpha}$ is a M x 1 vector of parameters to be estimated, and U is a N x M matrix of known constants in correlation form (that is,

$$\sum_{j=1}^{N} u_{jp} = 0 \text{ and}$$

$$\sum_{j=1}^{N} u_{jp}^{2} = 1, \text{ for } p=1,2,\ldots,M).$$

The ordinary least squares estimates of $\underline{\alpha}$ are

$$\hat{\underline{\alpha}} = (\underline{U}'\underline{U})^{-1}\,\underline{U}'\underline{V} \quad \text{with}$$

(6)

$$\text{var}(\hat{\underline{\alpha}}) = \sigma^2(\underline{U}'\underline{U})^{-1}$$

Let $\lambda_1, \lambda_2, \ldots, \lambda_{pM}$ denote the characteristic roots of $\underline{U}'\underline{U}$. It can be shown (Hoerl and Kennard, 1970a) that the mean square error of the estimates of the regression parameters is

$$E(L^2) = \sigma^2 \sum_{p=1}^{M} \left(\frac{1}{\lambda_p}\right)$$

where $L^2 = (\hat{\underline{\alpha}} - \underline{\alpha})'(\hat{\underline{\alpha}} - \underline{\alpha})$. If the U's are highly multicolinear some of the characteristic roots will be near zero resulting in a large mean square error of the regression parameters.

The ridge regression estimates proposed by Hoerl and Kennard (1970a) are

$$\hat{\underline{\alpha}}(k) = (U'U + kI)^{-1}\,U'V; \quad 0 \leq k \leq 1 \qquad (7)$$

where I is an $(M\text{x}M)$ identity matrix. It can be shown (Hoerl and Kennard, 1970a) that the mean square error of the ridge estimator is

$$E(L^2(k)) = \sigma^2 \sum_{p=1}^{M} \frac{\lambda_p}{(\lambda_p+k)^2} + k^2 \underline{\alpha}'(\underline{U}'\underline{U} + kI)\underline{\alpha}$$

in which the first term on the righthand side denotes the variance of the ridge estimator, and the second term denotes the bias squared of the ridge estimator. Hoerl and Kennard (1970a) provide the following theorems:

(1) The variance term is a continuous monotonically decreasing function of k.

(2) The bias squared term is a continuous monotonically increasing function of k, and

(3) There always exists a $k>0$ such that

$$E(L^2(k))<E(L^2).$$

In other words, there exists at least one value of k such that the mean square error of the ridge estimator is less than that of the ordinary least squares estimator. Unfortunately, the optimal value of k cannot be determined with certainty because it depends on the unknowns $\underline{\alpha}$ and σ^2. The value of k must be estimated from the data. An intractable distribution of the ridge estimator results from such a randomly chosen k. This accounts for the large number of papers dealing with computer simulations of ridge estimators mentioned earlier.

The unstandardized estimators are determined from the unstandardization formulas

$$\hat{\beta}_p = \hat{\alpha}_p/S_p \qquad \text{for } p=1,2,\ldots,M \tag{8}$$

and

$$\beta_0 = \bar{y} - \sum_{p=1}^{M} \hat{\alpha}_p\bar{X}_p. \tag{9}$$

4. Choosing the value of k--

Hoerl and Kennard (1970b) suggest a ridge trace [plot of $\hat{\alpha}(k)$ against k] for subjectively selecting a value for k. For the simulation described in the following section an objective method of selecting k is needed. Several investigators including Hoerl, Kennard, and Baldwin (1975), Lawless and Wang (1976), McDonald and Galarneau (1975) and Dempster, Schatzoff, and Wermuth (1977) have used computer simulation to study the properties of k estimated by various formulas. Although none of the formulas for estimating k from sample data can predict the optimal value of k, the formula proposed by Hoerl, Kennard, and Baldwin has performed well in most of these simulation studies. The Hoerl, Kennard, and Baldwin (1975) formula,

$$k = \frac{M\,\hat{\sigma}^2}{\underline{\hat{\alpha}}'\underline{\hat{\alpha}}} \qquad (10)$$

where $\hat{\sigma}^2$ is the sample estimate of σ^2 was used for this simulation study.

SIMULATION DESCRIPTION

The objective of these Monte Carlo experiments was to simulate a regional hydrologic regression problem in order to compare ordinary least squares (OLS) regression with ridge (RGE) regression. A model is assumed of the form

$$Q_{50} = aA^{\beta_1}S^{\beta_2}$$

where Q_{50} is the 50-year peak discharge for a site with basin characteristics A and S, and a, β_1, and β_2 are constants. Log transformation of variables allows this equation to be expressed as a linear regression model

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2$$

where $Y = \log_{10} Q_{50}$, $\beta_0 = \log_{10}\alpha$, $X_1 = \log_{10}A$, and $X_2 = \log_{10}S$.

The simulation proceeds as follows: [1/]

[1/] Another description of the simulation procedure in flow chart form can be found in Appendix D.

a) For each replication a set of N pairs of numbers representing X_1 and X_2 at N gaging stations was generated.

b) Next, it was assumed that the logarithms (base 10) of the annual peaks at station j in the region are drawn from a Pearson Type III distribution with mean μ_j, standard deviation σ_j and skew coefficient $\gamma=0$. Further it was assumed that

$$\mu_j = \beta_0 + \beta_1 X_{j,1} + \zeta_j \qquad j=1,2,\ldots,N \qquad (11)$$

and

$$\sigma_j = \acute{\beta}_2 \; X_{j,2} + \eta_j \qquad j=1,2,\ldots,N \qquad (12)$$

in which ζ_j and η_j are normally and independently distributed random disturbances with means zero and standard deviations $\sigma(\zeta_j)$ and $\sigma(\eta_j)$, respectively. Hence, the true regression model to be estimated by generated samples is obtained by substituting the righthand side of (11) and (12) into the first equation on page 7, so that,

$$E(Y|X_1,X_2) = \beta_0 + \beta_1 X_1 + k_0(\acute{\beta}_2 \; X_2)$$

$$E(Y|X_1,X_2) = \beta_0 + \beta_1 X_1 + \beta_2 X_2$$

where $E(Y|X_1,X_2)$ is the expected value of Y given X_1 and X_2, k_0 = 2.05375 is the standardized Pearson Type III deviate for a 50-year return period. and skew coefficient of zero, from Harter's (1969) tables, $\beta_2 = k_0\acute{\beta}_2$, and β_0, β_1 and $\acute{\beta}_2$ are constants.

For all experiments the values of regression parameters β_0 and β_1 were taken to be identically 0 and 1, respectively. The value of $\acute{\beta}_2$ was set equal to 0.5 in some experiments and 1.5 in others. Substituting these known values into the equation above yields the true regression model

$$E(Y|X_1,X_2) = \begin{cases} (1.0)X_1 + (1.026875)X_2, \text{ when } \beta_2' = .5 \\ (1.0)X_1 + (3.080625)X_2, \text{ when } \beta_2' = 1.5 \end{cases}$$

c) In step b, it was assumed logarithms of annual peaks were drawn from an underlying Pearson Type III distribution with skew coefficient zero. This is equivalent to assuming a log normal distribution (Johnson and Kotz, 1970, p. 170). Therefore, a multi-variate streamflow generator (Matalas, 1967) was used to synthesize the common logarithms of a sequence of n observed annual peaks; $z_{1,j}, z_{2,j}, z_{3,j}, \ldots, z_{n,j}$; at 20 stations in a simulation region while preserving the following assumptions: 1) the random variable Z_j is normally and independently distributed in time with mean μ_j and standard deviation σ_j, and 2) the cross correlation between logarithms of annual peaks for any pair of stations (ρ_c) is a constant for all pairs of stations.

d) The estimated value of y at station j to be used as the dependent variable in the simulated regressions is given by

$$\hat{y}_j = \bar{z}_j + \hat{k}_{50}\, s_j$$

in which $\bar{z}_j$ and s_j are sample mean and standard deviation given by equations (1) and (2), and $\hat{k}_{50}$ is the standardized Pearson Type III deviate given in Harter's (1969) tables for a 50-year recurrence interval as a function of weighted skew coefficient $\hat{g}_j$ (equation 3), in which $\bar{g}_j$ is assumed to be zero. In the simulation program it was not necessary to compute sample skew because the weighting formula gives zero weight to sample skew for the record lengths used.

e) Regression parameters using OLS and RGE were determined from equations (6) and (7) and unstandardized using equations (8) and (9).

SIMULATION DESIGN

The performance of an operational ridge estimator depends on (1) the correlations among basin characteristics ρ, (2) the variance of sampling error $\sigma^2(\varepsilon_j)$, (3) the degree to which estimates of the dependent variable are related, (4) the variance of the model error $\sigma^2(\partial_j)$, and (5) the regression coefficient vector β. The simulation was divided into 294 experiments with 500 replicatons of each experiment. Separate experiments were conducted by changing one of the five factors above while the remaining four were fixed.

In order to evaluate the performance of RGE with respect to ρ, for each replication a new set of N pairs of basin characteristics,

$$\{X_{1,1}, X_{1,2}; X_{2,1}, X_{2,2}; X_{3,1}, X_{3,2}; \ldots\ldots ;X_{n,1}, X_{n,2}\}$$

were randomly selected from uniform distributions on the intervals (0,2) for $X_{j,1}$ and (1,3) for $X_{j,2}$ with correlations ρ, between $X_{j,1}$ and $X_{j,2}$. (See Appendix C for the method of generating correlated uniform pseudo-random numbers).

Forty-two experiments were run with each of seven values for ρ (ρ = 0.0, 0.249, 0.50, 0.75, 0.90, 0.95, 0.989). These correlations introduce a range of levels of multicolinearity into the simulation which may also be expressed as *VIF*'s (*VIF*=1.0, 1.066, 1.333, 2.286, 5.263, 10.256, and 45.706, respectively).

The variance of the sampling error is a function of the number of stations in the regression, N, and the number of years of record at each site, n. In order to evaluate the performance of *RGE* with respect to sampling errors, separate experiments were run with six different combinations of N and n [(N,n) = (15,10), (15,25) (25,10), (25,25), (40,10), (40,25)].

One of the assumptions of classical regression analysis is that the y's associated with a given set of x_{jp}'s are independently distributed. This assumption is, in general, not valid because the flows at different gaging stations are correlated. The accuracy of a regional regression model depends, in part, on the degree to which estimates of the dependent variable are related (Matalas and Gilroy, 1968). Hardison (1976) has shown the interstation correlation between observed 50-year peaks, ρ_{50}, is approximated by

$$\rho_{50} = \rho_c^{2.07}$$

where ρ_c is the interstation correlation between logarithms of annual peaks. In order to assess the effect of different values of ρ_c on the results, separate simulation runs were made with ρ_c = 0, .4, and .8 or ρ_{50} = 0, .15, and .63.

The random disturbances ζ_j and η_j in equations (11) and (12) measure the discrepancies between the population values of μ_i and σ_j and their linear estimators. Therefore, the variances of ζ_j and η_j ($\sigma^2(\zeta_j)$ and $\sigma^2(\eta_j)$) may be thought of as a measure of error in the underlying model. Because the magnitudes of $\sigma^2(\zeta_j)$ and $\sigma^2(\eta_j)$ affect the accuracy of the regression model separate simulation runs were made with $\sigma(\zeta_j) = \sigma(\eta_j)$ = 0.01, 0.05, and 0.20 to assess the effect of model error on the results. In actual hydrologic regressions little is known about model error because they are masked by sampling errors. However, the range of model error in this study (.01 to .2) is expected to adequately cover the practical range in model error for useful hydrologic regressions.

For most experiments the true regression coeffients, β_0, β_1, and β_2, were set equal to 0, 1.0, and 1.026875, respectively. In order to gain insight into how changes in β might affect the performance of *RGE*, some additional experiments were made with β_2 = 3.080625 and β_0 = 0 and β_1 = 1.0.

The 294 experiments are distinguished by having a different combination of input variables ρ, N, n, ρ_c, $\sigma^2(\zeta_j)$, and β_i. Table 1A in appendix A shows the values of these input variables for each of the experiments. Because this table and all others were printed on a line printer without lower case or Greek letters, some notational changes were necessary and are given on the first page of each table.

Initially experiments were run on the IBM 370/155 1/ computer at the U.S. Geological Survey, Reston, Virginia. Later experiments were run on a Harris 125-S computer 2/ at the U.S. Geological Survey, Northeastern Region, Reston, Virginia. A listing of the computer program for the Harris computer is given in Appendix B.

Performance Measures

Let $\hat{\beta}_1$ and $\hat{\beta}_2$ (*B*10 and *B*20) denote OLS estimates of β_1 and β_2, and let $\hat{\beta}_1(k)$ and $\hat{\beta}_2(k)$ (*B*1*R* and *B*2*R*) denote the RGE estimates. For each experiment the root-mean-square error (RMSE) for OLS and RGE estimators of β_1 and β_2 are defined as follows:

$$RMSE\text{-}B10 = \left[\frac{1}{NR} \sum_{r=1}^{NR} (\hat{\beta}_1 - \beta_1)_r^2 \right]^{\frac{1}{2}}$$

$$RMSE\text{-}B20 = \left[\frac{1}{NR} \sum_{r=1}^{NR} (\hat{\beta}_2 - \beta_2)_r^2 \right]^{\frac{1}{2}}$$

$$RMSE\text{-}B1R = \left[\frac{1}{NR} \sum_{r=1}^{NR} (\hat{\beta}_1(k) - \beta_1)_r^2 \right]^{\frac{1}{2}}$$

$$RMSE\text{-}B2R = \left[\frac{1}{NR} \sum_{r=1}^{NR} (\hat{\beta}_2(k) - \beta_2)_r^2 \right]^{\frac{1}{2}}$$

where *NR* is the number of replications of the experiment (*NR*=500

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for the 294 experiments and NR = 100, 500, 1000, 2000, 3000, 4000, or 5000 for the sensitivity analysis explained below). The mean deviation was also computed as

$$BIAS\text{-}B1\emptyset = \frac{1}{NR} \sum_{r=1}^{NR} (\hat{\beta}_1 - \beta_1)$$

$$BIAS\text{-}B2\emptyset = \frac{1}{NR} \sum_{r=1}^{NR} (\hat{\beta}_2 - \beta_2)$$

$$BIAS\text{-}B2R = \frac{1}{NR} \sum_{r=1}^{NR} (\hat{\beta}_1(k) - \beta_1)$$

$$BIAS\text{-}B2R = \frac{1}{NR} \sum_{r=1}^{NR} (\hat{\beta}_2(k) - \beta_2)$$

Two other useful performance measures are the probabilities that the RGE estimates of β_1 and β_2 will be "closer" to the true values than will the OLS estimates. These probabilities, respectively, labeled P-RGE1 and P-RGE2 were determined for each experiment by the following

Let

$$Q_{r,L} = \begin{cases} 1, & \text{if } |\hat{\beta}_L(k) - \beta_L|_r < |\hat{\beta}_L - \beta_L|_r \\ 0, & \text{otherwise} \end{cases}$$

for $r = 1,2,\ldots,NR$ and $L = 1,2$. Then

$$P\text{-}RGE1 = \frac{1}{NR} \sum_{r=1}^{NR} Q_{r,1} \qquad \text{and}$$

$$P\text{-}RGE2 = \frac{1}{NR} \sum_{r=1}^{NR} Q_{r,2} \quad .$$

It is not sufficient to compare *OLS* and *RGE* on the basis of individual parameters alone, because it is the linear combination of these parameters which yields a predicted peak discharge. Perhaps a more reasonable measure by which to compare *OLS* and *RGE* is the total mean square error of prediction, SE_T^2 . Let $\hat{y}$ denote the predicted value of y given $\hat{\beta}_0$, $\hat{\beta}_1$, and $\hat{\beta}_2$. SE_T^2 for all possible values of X_1 and X_2 given $\hat{\beta}_0$, $\hat{\beta}_1$, and $\hat{\beta}_2$ is given by

$$
\begin{aligned}
SE_T^2 &= E[(\hat{y}-y)^2 | \hat{\beta}_0\hat{\beta}_1\hat{\beta}_2] \\
&= E[(\hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2) - (\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \partial + \varepsilon)]^2 \\
&= (\hat{\beta}_0 - \beta_0)^2 + (\hat{\beta}_1 - \beta_1)^2(\sigma_{x_1}^2 + \mu_{x_1}^2) + (\hat{\beta}_2 - \beta_2)^2(\sigma_{x_2}^2 \\
&\quad + \mu_{x_2}^2) \\
&\quad + 2(\hat{\beta}_0 - \beta_0)(\hat{\beta}_1 - \beta_1)\mu_{x_1} + 2(\hat{\beta}_0 - \beta_0)(\hat{\beta}_2 - \beta_2)\, \mu_{x_2} \\
&\quad + 2(\hat{\beta}_1 - \beta_1)(\hat{\beta}_2 - \beta_2)(\mathrm{cov}(X_1,X_2) + \mu_{x_1}\, \mu_{x_2}) \\
&\quad + \sigma^2(\partial) + \sigma^2(\varepsilon) \qquad (13)
\end{aligned}
$$

where ∂ and ε are independent random variables with zero means, and μ_{x_1}, $\sigma_{x_1}^2$, μ_{x_2}, and $\sigma_{y_2}^2$ are respectively the means and variances of x_1 and x_2.

Because X_1 and X_2 are uniform random numbers on the intervals (0,2) and (1,3), respectively, with correlation ρ then

$$\mu_{x_1} = 0 + \frac{2-0}{2} = 1$$

$$\sigma_{x_1}^2 = \frac{(2-0)^2}{12} = \frac{1}{3}$$

$$\mu_{x_2} = 1 + \frac{3-1}{2} = 2$$

$$\sigma_{x_2}^2 = \frac{(3-1)^2}{12} = \frac{1}{3}$$

and $\mathrm{cov}(X_1, X_2) = \sigma_{x_1}\, \sigma_{x_2}\rho = \frac{1}{3}\,\rho$.

For each experiment the values of β_0, β_1, β_2, ρ, $\sigma^2(\partial)$, and $\sigma^2(\varepsilon)$ are known. Each replication within an experiment produced two sets of estimates-- $\hat{\beta}_0$, $\hat{\beta}_1$, $\hat{\beta}_2$ and $\hat{\beta}_0(k)$, $\hat{\beta}_1(k)$, $\hat{\beta}_2(k)$. Therefore, for each replication of an experiment two values of SE_T^2 are computed--one associated with the *OLS* estimator $SE^2_{T,OLS}$ and one associated with the *RGE* estimator $SE^2_{T,RGE}$. The square root of SE_T^2 is calculated and called the true standard error. For each experiment the mean true standard error (MTSE) using OLS and RGE are calculated by

$$MTSE\text{-}OLS = \frac{1}{NR} \sum_{r=1}^{NR} (SE_{T,OLS})_r$$

and

$$MTSE\text{-}RGE = \frac{1}{NR} \sum_{r=1}^{NR} (SE_{T,RGE})_r .$$

Also, the standard deviation of the true standard error (STSE) is computed for each experiment,

$$STSE\text{-}OLS = [\frac{1}{NR} \sum_{r=1}^{NR} (SE_{T,OLS} - MTSE\text{-}OLS)_r^2]^{\frac{1}{2}}$$

$$STSE\text{-}RGE = [\frac{1}{NR-1} \sum_{r=1}^{NR} (SE_{T,RGE} - MTSE\text{-}RGE)_r^2]^{\frac{1}{2}}$$

For comparison, the mean and standard deviations of the observed standard errors (MOSE and SOSE) were computed and labeled *MOSE-OLS, MOSE-RGE, SOSE-OLS,* and *SOSE-RGE* where the observed standard error is the square root of the variance of the residuals, $(\hat{y}-y)$.

It is important to recognize the source of multicolinarily in a regression problem. For purposes of discussion, let us assume that bias introduces a multicolinearity in basin characteristics that is not inherent in the actual hydrologic region. For example, assume that there is a hydrologic region of varying elevation consisting of parcels of cleared land and parcels of forested land where gaging stations in the area had been placed years before for reasons other than trying to randomly sample basin characteristics. As a result, stations at low elevations drained mostly cleared land while high elevation stations drained mostly forested land, resulting in a high sample correlation between elevation and forest cover which is not an inherent characteristic of the region. In order to compare performance of *OLS* and *RGE* estimators in this situation, a new value of SE_T^2 is computed from equation (13) with $\text{cov}(X_1,X_2)=0$. The means and standard deviations of SE_T (MTSEO and STSEO) calculated with $\text{cov}(X_1,X_2)=0$ are given by

$$MTSEO\text{-}\emptyset = \frac{1}{NR}\sum_{r=1}^{NR} (SE_{T,OLS})_r$$

$$MTSEO\text{-}R = \frac{1}{NR}\sum_{r=1}^{NR} (SE_{T,RGE})_r$$

$$STSEO\text{-}\emptyset = \left[\frac{1}{NR-1}\sum_{r=1}^{NR} (SE_{T,OLS} - MTSEO\text{-}\emptyset)_r^2\right]^{\frac{1}{2}}$$

and $$STSEO\text{-}R = \left[\frac{1}{NR-1}\sum_{r=1}^{NR} (SE_{T,RGE} - MTSEO\text{-}R)_r^2\right]^{\frac{1}{2}}$$

In addition, some sampling statistics of the biasing parameter, k, and the basin characteristic correlation coefficient, ρ, were computed. For each replication a new value of k was computed using equation (10). In each experiment the mean, maximum, and minimum values of k were determined and denoted as *K-MEAN*, *K-MAX*, and *KMIN*, respectively. For each replication a sample correlation, $\hat{\rho}$, between X_1 and X_2 was computed. For each experiment the mean deviation of the sample correlation from the true correlation (*BIAS-RHO*) and the root-mean-squared deviation of sample correlation (*RMSE-RHO*) were computed as

$$BIAS\text{-}RHO = \frac{1}{NR} \sum_{r=1}^{NR} (\hat{\rho} - \rho)_r$$

$$RMSE\text{-}RHO = \left[\frac{1}{NR} \sum_{r=1}^{NR} (\hat{\rho} - \rho)_r^2\right]^{\frac{1}{2}} .$$

In order to determine if 500 replications were adequate, a sensitivity analysis was performed. Four different experiments were replicated 100, 500, 1000, 2000, 3000, and 5000 times, and the results (Table 2A, appendix A) compared. The four experiments had the following sets of input variables:

Exp. No.	ρ	N	n	ρ_c	$\sigma^2(\zeta_j)$	β_2
1.	0.0	15	10	0.0	.01	.5
2.	0.0	15	10	0.8	.01	.5
3.	0.95	15	10	0.0	.01	.5
4.	0.95	15	10	0.8	.01	.5

Results indicate virtually no difference in the relative performance measures for 500 or 5000 replications. The sensitivity analysis showed that 500 replications were adequate.

EXPERIMENTAL RESULTS

In order to directly compare the *RGE* estimators with *OLS* estimators, the following ratios were computed: *RTSE* = *MTSE-RGE/MTSE-OLS* (the ratio of mean true standard errors); *RSET*1 = *MTSEO-R/MTSEO-0* (the ratio of mean true standard errors where the population covariance between X_1 and X_2 is zero); *RB*1 = *RMSE-B*1*R*/*RMSE-B*10 (the ratio of root-mean-square errors for estimating β_1); and *RB*2 = *RMSE-B*2*R*/*RMSE-B*20 (the ratio of root-mean-square errors for estimating β_2). A ratio of less than 1.0 indicates an advantage for the ridge estimator.

To concisely display the main results, each of these ratios and *P-RGE*1 and *P-RGE*2 are shown in box and whisker plots (Tukey, 1977) as a function of ρ (figures 1-6). Each box and whisker plot represents the results from forty-two experiments in which ρ was constant at the indicated value while some other input parameters (namely; N, n, ρ_c, $\sigma^2(\zeta)$, $\sigma^2(\eta)$, and β_2) were changed from experiment to experiment. In a box and whisker plot, the ends of the "whiskers" are maximum and minimum observed values, the "box" contains the middle 50 percent of observations, the dashed line represents the median value, and the "+" represents the mean value.

It is clear from these plots that the *RGE* estimator dominates the *OLS* estimator in this simulation when ρ is greater than or equal to .90 because all of the ratios (figures 1-4) are less than or equal to one and the probabilities (figures 5 and 6) are all greater than about 0.5. For values of ρ below about .5 the *OLS* estimator generally performed better than the *RGE* estimator. For values of ρ between .5 and .9, results of this experiment indicate the *RGE* estimator generally performed better than the *OLS* estimator with respect to the six measures of performance tested.

The relative performance of the *RGE* and *OLS* estimators is shown by table 1. In this table, results from the 294 experiments were grouped by ρ (denoted *RHO* in tables 1-6), then ranked according to *RTSE* within each group. Displayed along with *RTSE* are several key input parameters that were changed from experiment to experiment. When $\rho \geq .75$, the smallest values of *RTSE* occurred when ρ_c (the between-station correlation of annual peaks) was zero and N and n were relatively small (p. 36). Similar results were found with respect to *RSET*-1, *RB*1, *RB*2, *P-RGE*1, and *P-RGE*2 in tables 2-6. In other words, the *RGE* estimator performed much better than the *OLS* estimator under the conditions of high multicolinearity ($\rho \geq .90$), low between-station correlation of annual peaks (ρ_c = 0), and relatively few basins with relatively short records [(N,n) = (15,10), (25,10), or (15,25)].

Figures should be in a separate package with a caption page stapled to each for review purposes. Do not number figure pages in review copy

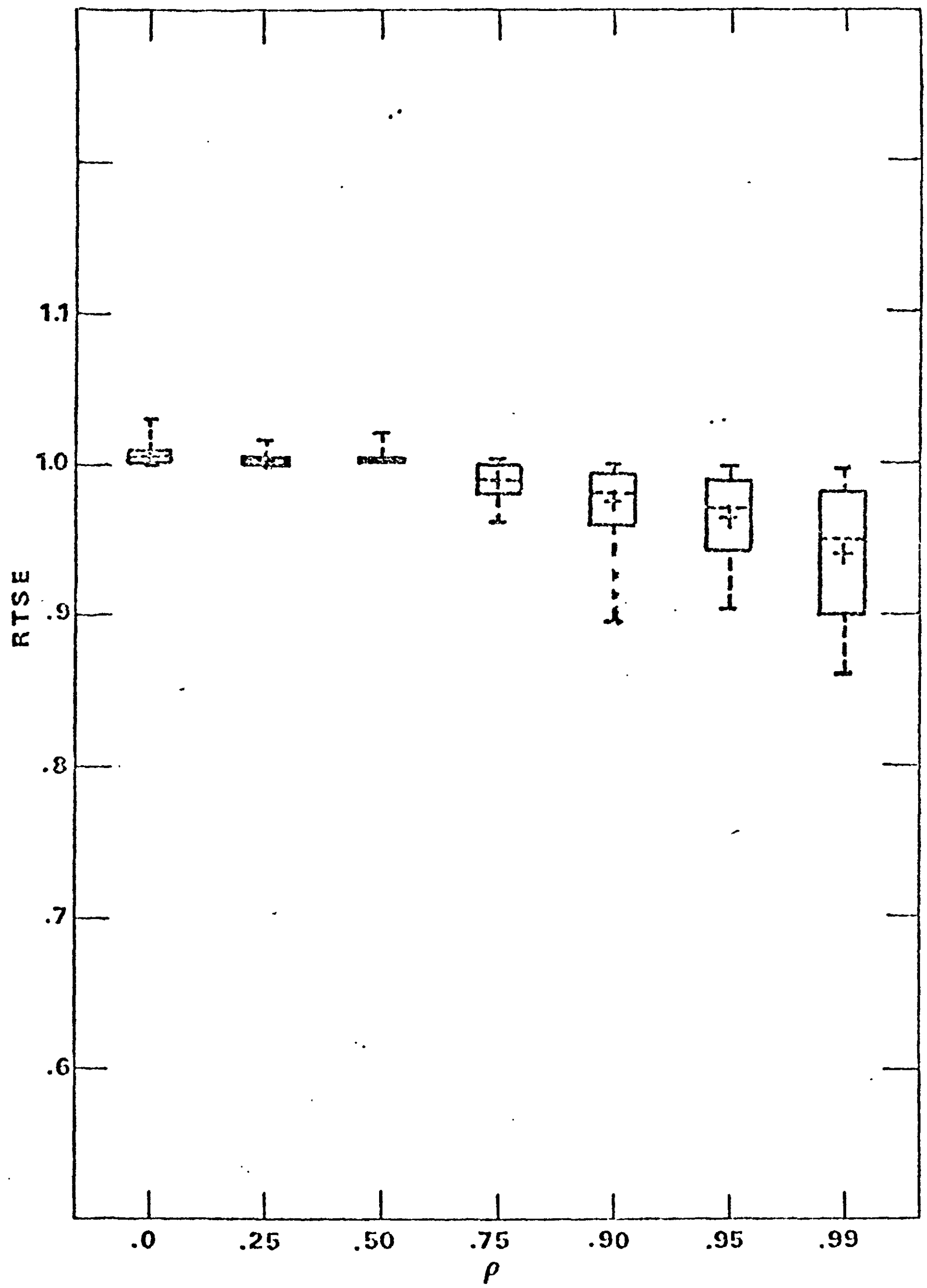

Figure 1.--Box-and-whisker plots showing the ratio of the mean true standard error using ridge regression to that using ordinary least squares regression, *RTSE*, as a function of the correlation between sample independent variables, ρ.

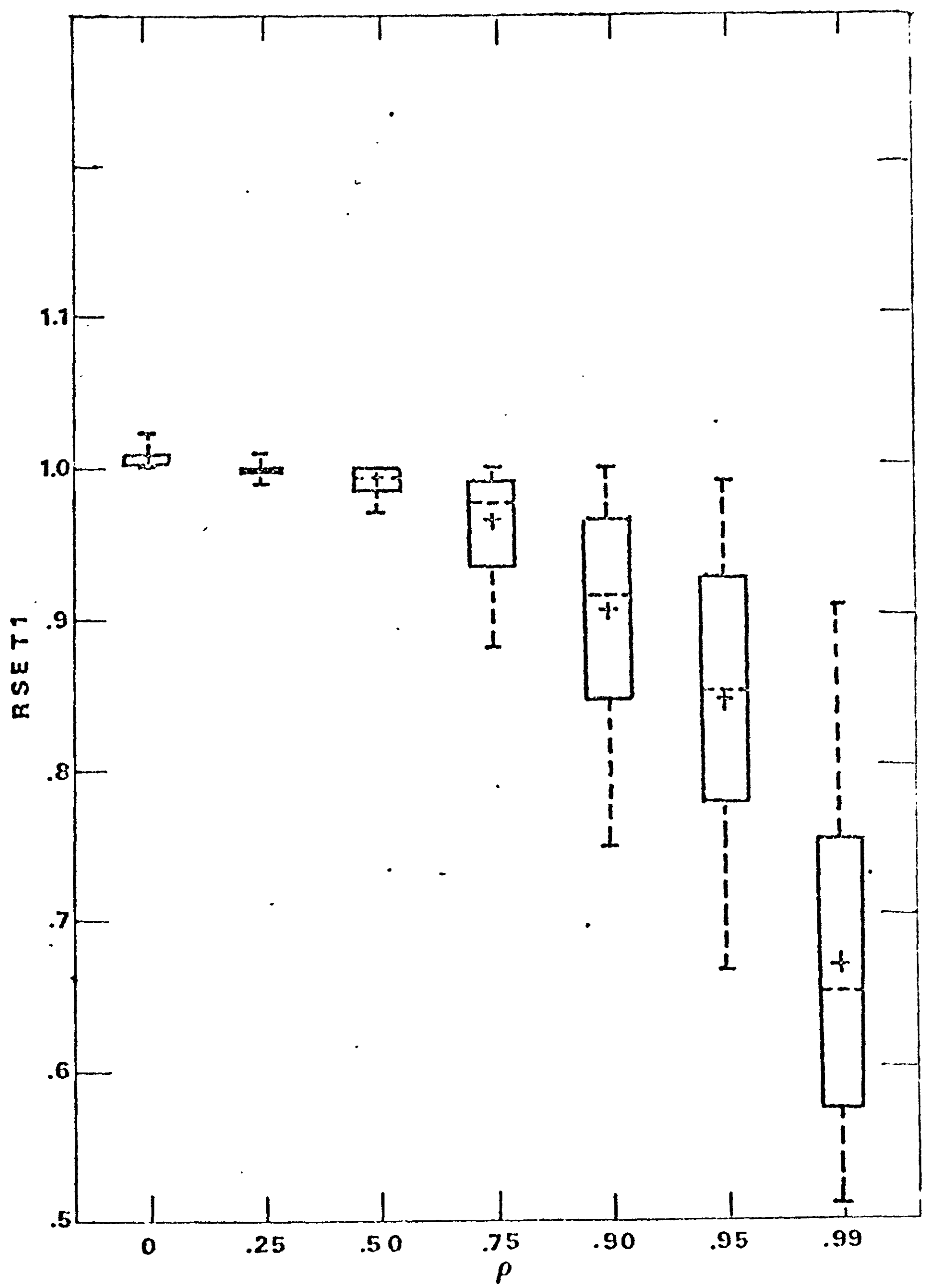

Figure 2.--Box-and-whisker plots showing the ratio of the mean true standard error, given the population covariance of independent variables is zero, using ridge regression to that using ordinary least squares regression, *RSET*1, as a function of the correlation between sample independent variables, ρ.

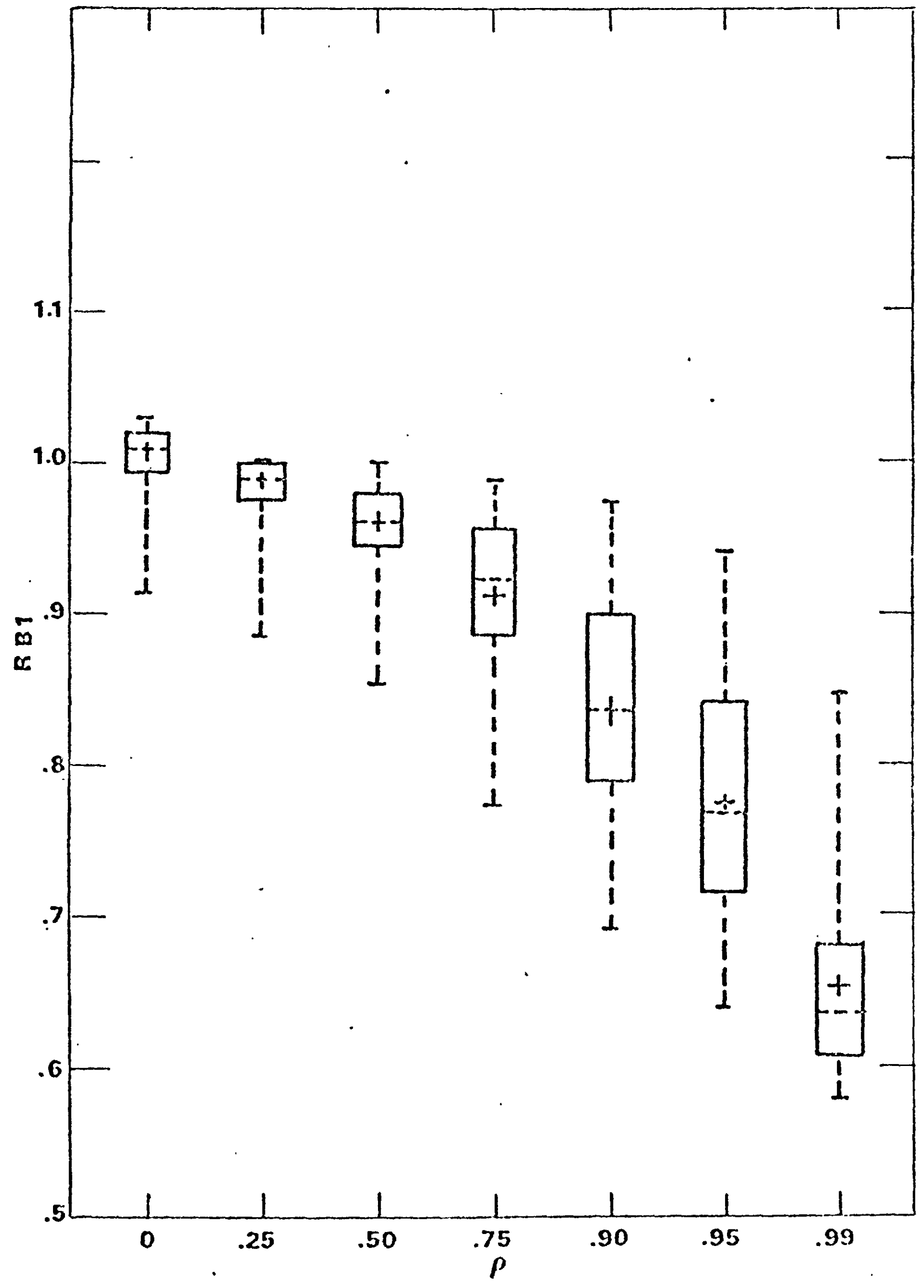

Figure 3.--Box-and-whisker plots showing the ratio of mean square errors for estimating β_1 using ridge regression to that using ordinary least squares regression, *RB1*, as a function of the correlation between sample independent variables, ρ.

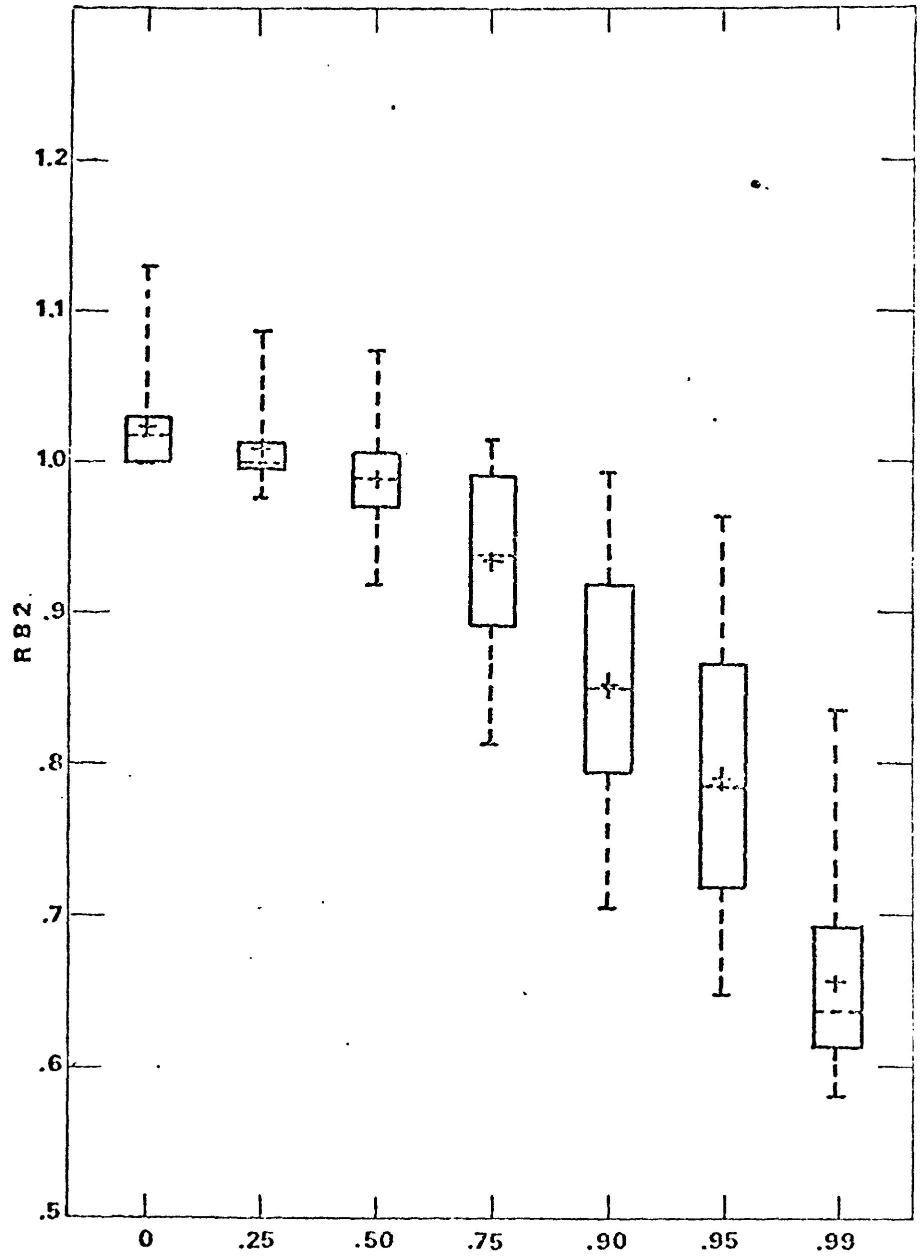

Figure 4.--Box-and-whisker plots showing the ratio of the mean square error for estimating β_2 using ridge regression to that using ordinary least squares regression, *RB2*, as a function of the correlation between sample independent variables, ρ.

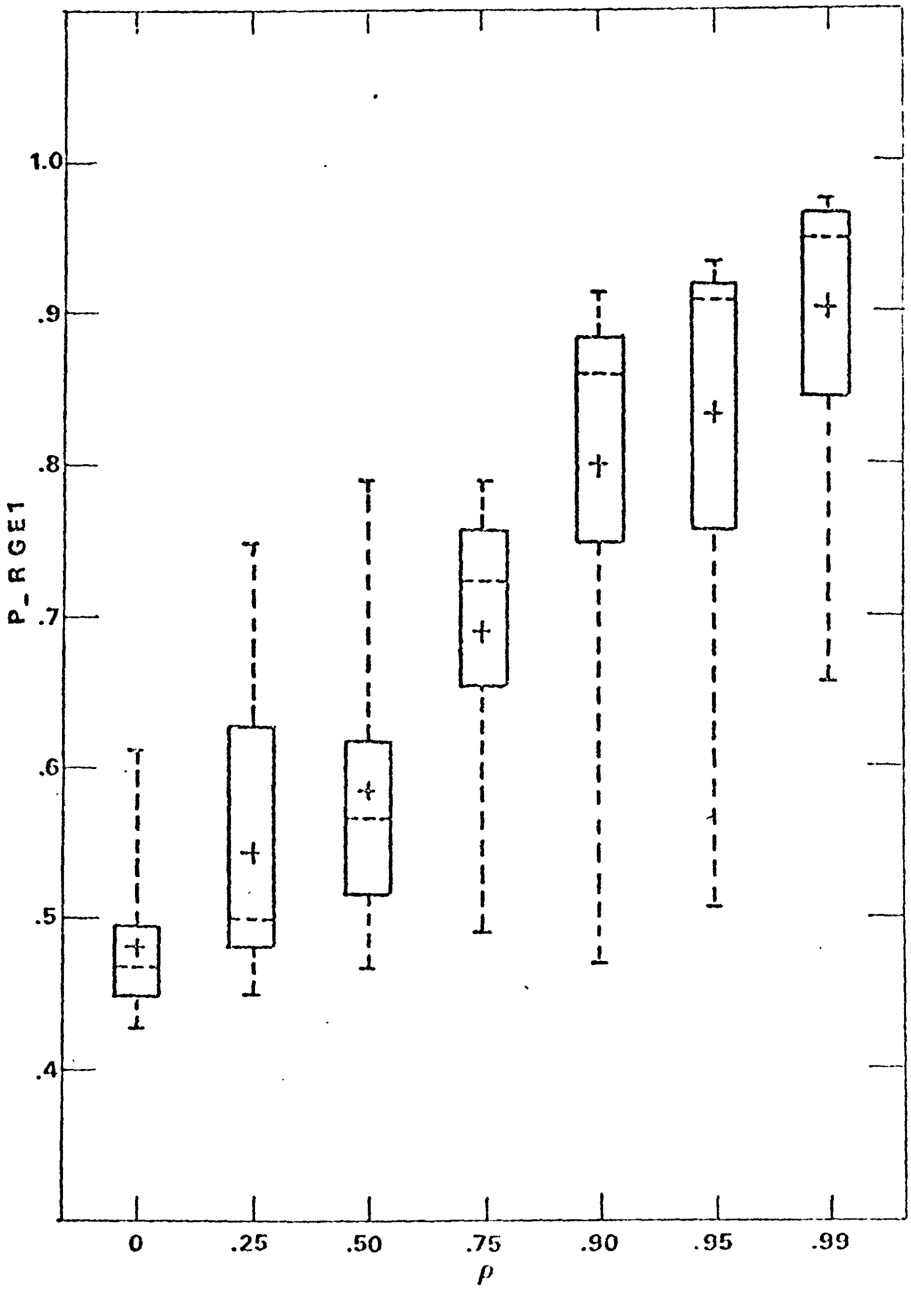

Figure 5.--Box-and-whisker plots showing the probability that the ridge regression estimate of β_1 will be closer to the true value of β_1 than will the ordinary least squares estimate, *P-RGE*1, as a function of the correlation between sample independent variables, ρ.

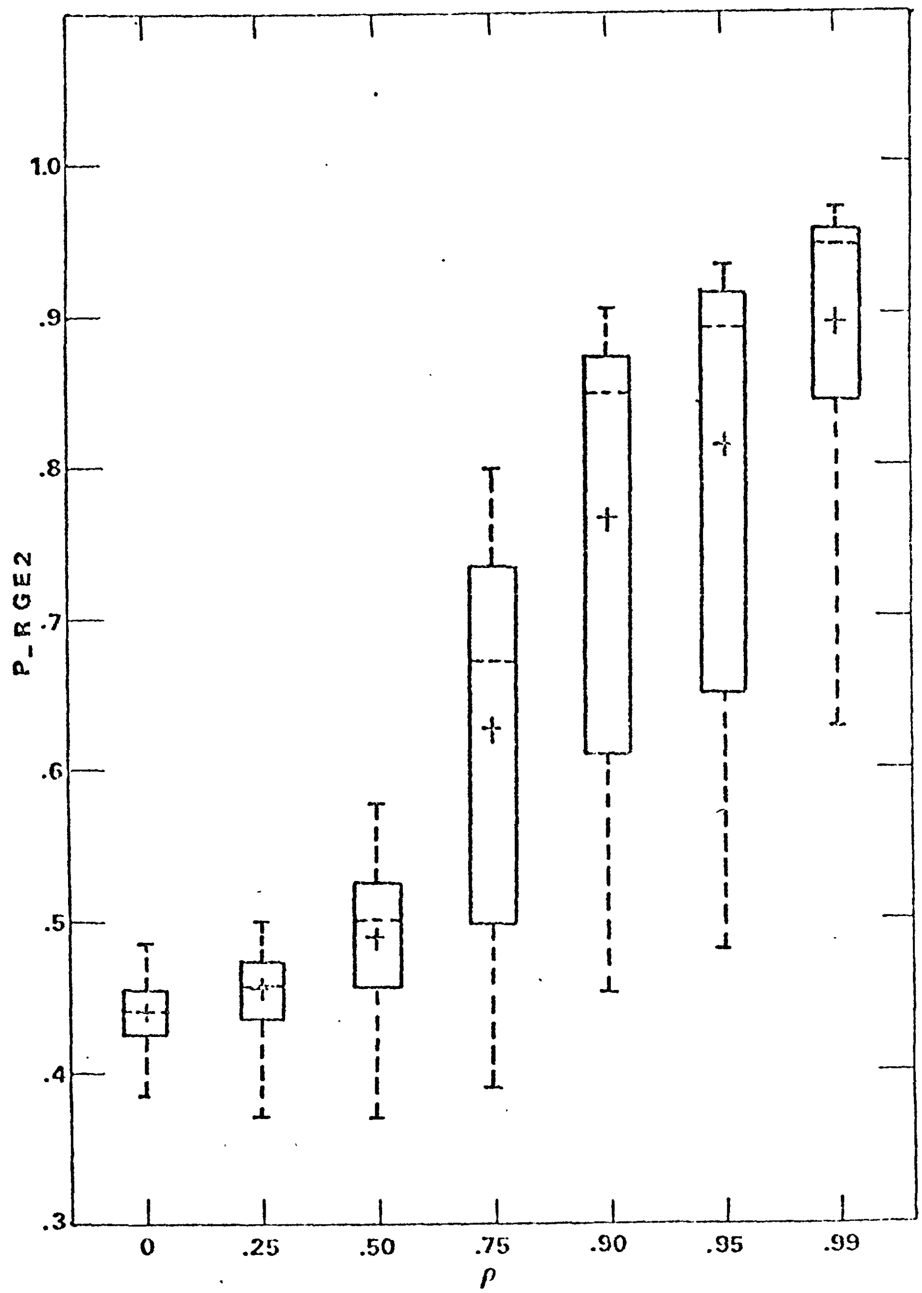

Figure 6.--Box-and-whisker plots showing the probability that the ridge regression estimate of β_2 will be closer to the true value of β_2 than will the ordinary least squares estimate, *P-RGE2*, as a function of the correlation between sample independent variables, ρ.

SUMMARY AND CONCLUSIONS

A regression simulator was combined with a multisite streamsite streamflow generator to simulate a regional hydrologic regression. Monte Carlo experiments were used to compare an operational ridge regression estimator with ordinary least squares regression estimator. The simulation indicates a potential for improved parameter estimation for hydrologic regressions when multicolinearity is a problem. It also demonstrates a method of evaluating the performance of potentially useful bias regression estimators which are hard to evaluate analytically for specific hydrologic regression problems.

In one sense the simulation was large because 145,000 regressions were simulated. But in a more important sense it was small--only two explanatory variables, constant values for β_0 and β_1, and only two values for β_2 were tested. Although the simulation favors ridge regression for highly multicolinear data and the models tested, the evidence for ridge regression is not compelling for hydrologic regressions in general because of the small number of explanatory variables and narrow range of regression parameters. Future studies on this problem should include more than two explanatory variables, a wider range of regression parameters, other means of estimating k, and other biased estimators--such as the James-Stein estimator (James and Stein, 1961).

REFERENCES

Anderson, D. A., and Scott, R. G., 1974, The application of ridge regression to a hydrologic target-control model: Water Resources Bulletin, v. 10, no. 4, p. 680-690.

Baldwin, K. F., and Hoerl, A. E., 1978, Bounds on minimum mean squared error in ridge regression: Commun. in Statist., v. A7, no. 13, p. 1209-1218.

Benson, M. A., and Matalas, N. C., 1967, Synthetic hydrology based on regional statistical parameters: Water Resources Research, v. 3, no. 4, p. 931-935.

Bobée, B., 1973, Sample error of T-year events computed by fitting a Pearson Type 3 distribution: Water Resources Research, v. 9, no. 5, p. 1264-1270.

Chatterjee, S., and Price, B., 1977, Regression analysis by example: John Wiley and Sons, New York, N. Y., 228 p.

Conniffe, D., and Stone, J., 1973, A critical view of ridge regression: The Statistician, v. 22, no. 2, p. 181-187.

Cramer, S. G., and Hsieh, W. T., 1978, A simulation study of five biased estimators for straight line regression: Commun. Statist., v. B7, no. 6, p. 529-548.

Dempster, A. P., Schatzoff, M., and Wermuth, N., 1977, A simulation study of alternatives to ordinary least squares: J. of American Statistical Association, v. 72, no. 357, p. 77-91.

Draper, N. R., and Smith, H., 1966, Applied regression analysis: John Wiley and Sons, New York, N.Y., 405 p.

Draper, N. R., and Van Nostrand, R. C., 1979, Ridge regression and James-Stein estimation; Review and comments: Technometrics, v. 21, no. 4, p. 451-466.

Espey, W. H., and Winslow, D. E., 1974, Urban flood frequency characteristics: J. of the Hydraulics Division, Proceedings of the American Society of Civil Engineers, v. 100, no. HY2, p. 279-293.

Farebrother, R. W., 1978, Partitioned ridge regression: Technometrics, v. 20, no. 2, p. 121-122.

Golub, G. H., Heath, M., and Wahba, G., 1979, Generalized cross-validation as a method for choosing a good ridge parameter: Technometrics, v. 21, no. 2, p. 215-223.

Hardison, C. H., 1976, Interstation correlation of peak-flow estimates: Jour. of Research, U.S. Geol. Survey, v. 4, no. 2, p. 221-222.

Harter, H. L., 1969, A new table of percentage points of the Pearson Type III distribution: Technometrics, v. 11, no. 1, p. 177-187.

Hemmerle, W. J., and Brantle, T. F., 1978, Explicit and constrained generalized ridge estimation: Technometrics, v. 20, no. 2, p. 109-120.

Hocking, R. R., Speed, F. S., and Lynn, M. J., 1976, A class of biased estimators in linear regression: Technometrics, v. 18, no. 4, p. 425-437.

Hoerl, A. E., 1962, Application of ridge analysis to regression problems: Chemical Engineering Progress, v. 58, p. 54-59.

Hoerl, A. E., and Kennard, R. W., 1970a, Ridge regression: biased estimation for nonorthogonal problems: Technometrics, v. 12, no. 1, p. 55-67.

Hoerl, A. E., and Kennard, R. W., 1970b, Ridge regression: applications to nonorthogonal problems; Technometrics, v. 12, no. 1, p. 69-82.

Hoerl, A. E., and Kennard, R. W., 1976, Ridge regression interactive estimation of the biasing parameter: Commun. Statis., v. A5, no. 1, p. 77-88.

Hoerl, A. E., Kennard, R. W., and Baldwin, K. F., 1975, Ridge regression: some simulations: Commun. Statis., v. 4, no. 2, p. 105-123.

Hsiang, T. C., 1975, A Bayesian view on ridge regression: The Statistician: v. 24, no. 4, p. 267-268.

James, W., and Stein, C., 1961, Estimation with quadratic loss: in Proceedings of the Fourth Berkeley Symposium on Mathematical Statistics and

Probability, v. 1, ed. by Jerzy Neyman, Univ. of California Press, Berkeley, Calif.

Johnson, N. L., and Kotz, S., 1970, Distributions in statistics: Continuous univariate distributions--1: Houghton Mifflin Co., Boston, Mass.

Johnston, J., 1972, Econometric methods 2nd edition: McGraw-Hill Book Co., New York, N.Y.

Kitanidis, P. K., and Bras, R. L., 1978, A study of colinearity and parameter stability in rainfall-runoff models; ridge regression and Kalman filtering in Applications of Kalman filter to hydrology, hydraulics and water resources: ed. Chiu, Chao-Lin; Proceedings of AGU Chapman Conference, Pittsburgh, Penn., May 22-24, 1978, published by Stochastic Hydraulics Program, Dept. of Civil Eng., Univ. of Pittsburgh, Pittsburgh, Penn.

Lawless, J. F., 1978, Ridge and related estimation procedures: Theory and practice: Commun. Statist., v. A7, no. 2, p. 139-164.

Lawless, J. F., and Wang, P., 1976, A simulation study of ridge and other regression estimators: Commun. Statist., v. A5, no. 4, p. 307-323.

Marquardt, D. W., 1970, Generalized inverses, ridge regression: v. 12, no. 3, p. 591-612.

Marquardt, D. M., and Snee, R. D., 1975, Ridge regression in practice: The American Statistician, v. 29, no. 1, p. 3-20.

Mason, R. L., Gunst, R. F., and Webster, J. T., 1975, Regression analysis and problems of multicolinearity: Commun. Statist., v. 4, no. 3, p. 277-292.

Matalas, N. C., 1967, Mathematical assessment of synthetic hydrology: Water Resources Research, v. 3, no. 4, p. 937-945.

Matalas, N. C., and Gilroy, 1968, Some comments on regionlization in hydrologic studies: Water Resources Research, v. 4, no. 6, p. 1361-1369.

Mayer, L. S., and Wilke, T. A., 1973, On biased estimation in linear models: Technometrics, v. 15, no. 3, p. 497-508.

McDonald, G. C., and Galarneau, 1976, A Monte Carlo evaluation of some ridge-type estimators: J. American Statistical Association, v. 70, no. 350, p. 407-416.

Montgomery, D. C., 1979, Ridge regression with robust criteria: Presented at Washington Statistical Society Chapter of American Statistical Association meeting Oct. 22, 1979, Washington, D. C.

Moss, M.E., and Karlinger, M.R., 1974, Surface water network design by regression analysis simulation: Water Resources Research, v. 10, no. 3, p. 427-433.

Oman, S. D., 1978, A Bayesian comparison of some estimators used in linear regression with multicolinear data: Commun. Statist., v. A7, no. 6, p. 517-534.

Peele, L. C., and Ryan, T. P., 1979, The merits of some new ridge regression estimators: Presented at the Joint Annual Meetings of the American Statistical Association, The Institute of Mathematical Sciences, and the Biometric Society, Aug. 16, 1979, Washington, D. C.

Rolph, J. E., 1976, Choosing shrinkage estimators for regression problems: Commun. Statist., v. 5A, p. 789-802.

Smith, V. E., Anderson, D. A., and Scott, R. G., 1973, Elevation dependent model for estimating annual runoff: Proceedings American Society of Civil Eng., J. of Hydraulics Div., v. 100, no. HY12, p. 2293-2311.

Swamy, P. A. V. B., Mehta, J. S., and Rappoport, P. N., 1978, Two methods of evaluating Hoerl and Hennard's ridge regression: Commun. Statist., v. A7, no. 12, p. 1133-1155.

Theobald, C. M., 1974, Generalizations of mean square error applied to ridge regression: J. Royal Statistical Society, v. B36, p. 103-106.

Thomas, D. M., and Benson, M. A., 1970, Generalization of streamflow characteristics: U. S. Geol. Survey Water Supply Paper 1975, 55 p.

U.S. Water Resources Council, 1977, Guidelines for determining flood flow frequency: Hydrology Committee of Water Resources Council Bulletin no. 17A, Washington, D.C., 26 p. and appendices.

Vinod, H. D., 1976a, Canonical ridge and econometrics of joint production: J. of Econometrics, v. 4, p. 147-166.

Vinod, H. D., 1976b, Application of a new ridge regression method to a study of Bell System scale economics: J. American Statistical Association, v. 71, no. 356, p. 835-841.

Vinod, H. D., 1978, Equivariance of ridge estimators through standardization, a note: Commun. in Statist., v. A7, no. 12, p. 1157-1161.

Wichern, D. W., and Churchill, G. A., 1978, A comparison of ridge estimators: Technometrics, v. 20, no. 3, p. 301-311.

TABLE 1. Results of 294 experiments grouped by ρ and ranked within each group by RTSE.

Explanation

Because this table was printed on a line printer without lower case or Greek letters, the following notation changes were made:

Text notation	Equivalent table notation
ρ	RHO
N	NB
n	NY
ρ_c	RHO_C
$\sigma(\zeta_j)$	SD_ZETA
β_2	BETA_2

In all experiments,

$$\sigma(\eta_j)=\sigma(\zeta_j)$$

$$\beta_o=0.$$

$$\beta_1=1.$$

TABLE 1 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RTSE WITHIN EACH GROUP 1

RHO=0

RANK	RTSE	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	1.00000	101	25	10	0.8	0.01	0.5
2	1.00000	248	40	25	0.8	0.01	0.5
3	1.00000	249	40	25	0.0	0.05	0.5
4	1.00000	250	40	25	0.0	0.20	0.5
5	1.00000	252	40	25	0.8	0.01	1.5
6	1.00127	154	25	25	0.8	0.01	1.5
7	1.00159	105	25	10	0.8	0.01	1.5
8	1.00165	203	40	10	0.8	0.01	1.5
9	1.00197	201	40	10	0.0	0.20	0.5
10	1.00198	152	25	25	0.0	0.20	0.5
11	1.00248	199	40	10	0.8	0.01	0.5
12	1.00357	198	40	10	0.4	0.01	0.5
13	1.00358	52	15	25	0.8	0.01	0.5
14	1.00360	56	15	25	0.8	0.01	1.5
15	1.00375	103	25	10	0.0	0.20	0.5
16	1.00380	150	25	25	0.8	0.01	0.5
17	1.00455	51	15	25	0.4	0.01	0.5
18	1.00485	3	15	10	0.8	0.01	0.5
19	1.00495	99	25	10	0.0	0.01	0.5
20	1.00512	5	15	10	0.0	0.20	0.5
21	1.00535	149	25	25	0.4	0.01	0.5
22	1.00541	247	40	25	0.4	0.01	0.5
23	1.00575	151	25	25	0.0	0.05	0.5
24	1.00599	197	40	10	0.0	0.01	0.5
25	1.00649	7	15	10	0.8	0.01	1.5
26	1.00651	100	25	10	0.4	0.01	0.5
27	1.00813	148	25	25	0.0	0.01	0.5
28	1.00837	102	25	10	0.0	0.05	0.5
29	1.00929	54	15	25	0.0	0.20	0.5
30	1.00943	53	15	25	0.0	0.05	0.5
31	1.00966	200	40	10	0.0	0.05	0.5
32	1.01010	246	40	25	0.0	0.01	0.5
33	1.01045	251	40	25	0.0	0.01	1.5
34	1.01381	153	25	25	0.0	0.01	1.5
35	1.01524	2	15	10	0.4	0.01	0.5
36	1.01619	202	40	10	0.0	0.01	1.5
37	1.01807	50	15	25	0.0	0.01	0.5
38	1.01833	104	25	10	0.0	0.01	1.5
39	1.01993	4	15	10	0.0	0.05	0.5
40	1.02117	6	15	10	0.0	0.01	1.5
41	1.02230	1	15	10	0.0	0.01	0.5
42	1.02434	55	15	25	0.0	0.01	1.5

TABLE 1 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RTSE WITHIN EACH GROUP

RHO=0.249

RANK	RTSE	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	1.00000	9	15	10	0.4	0.01	0.5
2	1.00000	10	15	10	0.8	0.01	0.5
3	1.00000	12	15	10	0.0	0.20	0.5
4	1.00000	59	15	25	0.8	0.01	0.5
5	1.00000	155	25	25	0.0	0.01	0.5
6	1.00000	156	25	25	0.4	0.01	0.5
7	1.00000	157	25	25	0.8	0.01	0.5
8	1.00000	158	25	25	0.0	0.05	0.5
9	1.00000	159	25	25	0.0	0.20	0.5
10	1.00000	204	40	10	0.0	0.01	0.5
11	1.00000	205	40	10	0.4	0.01	0.5
12	1.00000	206	40	10	0.8	0.01	0.5
13	1.00000	207	40	10	0.0	0.05	0.5
14	1.00000	254	40	25	0.4	0.01	0.5
15	1.00000	255	40	25	0.8	0.01	0.5
16	1.00000	257	40	25	0.0	0.20	0.5
17	1.00080	210	40	10	0.8	0.01	1.5
18	1.00128	161	25	25	0.8	0.01	1.5
19	1.00133	259	40	25	0.8	0.01	1.5
20	1.00189	110	25	10	0.0	0.20	0.5
21	1.00198	208	40	10	0.0	0.20	0.5
22	1.00246	108	25	10	0.8	0.01	0.5
23	1.00247	112	25	10	0.8	0.01	1.5
24	1.00330	11	15	10	0.0	0.05	0.5
25	1.00338	107	25	10	0.4	0.01	0.5
25	1.00366	8	15	10	0.0	0.01	0.5
27	1.00367	61	15	25	0.0	0.20	0.5
28	1.00383	63	15	25	0.8	0.01	1.5
29	1.00392	14	15	10	0.8	0.01	1.5
30	1.00459	60	15	25	0.0	0.05	0.5
31	1.00467	58	15	25	0.4	0.01	0.5
32	1.00578	57	15	25	0.0	0.01	0.5
33	1.00633	256	40	25	0.0	0.05	0.5
34	1.00680	258	40	25	0.0	0.01	1.5
35	1.00808	209	40	10	0.0	0.01	1.5
36	1.00811	160	25	25	0.0	0.01	1.5
37	1.00847	109	25	10	0.0	0.05	0.5
38	1.00990	253	40	25	0.0	0.01	0.5
39	1.01005	106	25	10	0.0	0.01	0.5
40	1.01012	111	25	10	0.0	0.01	1.5
41	1.01471	13	15	10	0.0	0.01	1.5
42	1.01758	62	15	25	0.0	0.01	1.5

TABLE 1 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RTSE WITHIN EACH GROUP

RHO=0.5

RANK	RTSE	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.99206	162	25	25	0.0	0.01	0.5
2	0.99394	64	15	25	0.0	0.01	0.5
3	0.99438	68	15	25	0.0	0.20	0.5
4	0.99500	113	25	10	0.0	0.01	0.5
5	0.99522	67	15	25	0.0	0.05	0.5
6	0.99801	166	25	25	0.0	0.20	0.5
7	0.99803	215	40	10	0.0	0.20	0.5
8	1.00000	17	15	10	0.8	0.01	0.5
9	1.00000	19	15	10	0.0	0.20	0.5
10	1.00000	65	15	25	0.4	0.01	0.5
11	1.00000	66	15	25	0.8	0.01	0.5
12	1.00000	115	25	10	0.8	0.01	0.5
13	1.00000	116	25	10	0.0	0.05	0.5
14	1.00000	117	25	10	0.0	0.20	0.5
15	1.00000	163	25	25	0.4	0.01	0.5
16	1.00000	164	25	25	0.8	0.01	0.5
17	1.00000	165	25	25	0.0	0.05	0.5
18	1.00000	211	40	10	0.0	0.01	0.5
19	1.00000	212	40	10	0.4	0.01	0.5
20	1.00000	213	40	10	0.8	0.01	0.5
21	1.00000	214	40	10	0.0	0.05	0.5
22	1.00000	261	40	25	0.4	0.01	0.5
23	1.00000	262	40	25	0.8	0.01	0.5
24	1.00000	263	40	25	0.0	0.05	0.5
25	1.00000	266	40	25	0.8	0.01	1.5
26	1.00081	217	40	10	0.8	0.01	1.5
27	1.00125	168	25	25	0.8	0.01	1.5
28	1.00125	70	15	25	0.8	0.01	1.5
29	1.00162	119	25	10	0.8	0.01	1.5
30	1.00206	264	40	25	0.0	0.20	0.5
31	1.00241	21	15	10	0.8	0.01	1.5
32	1.00292	16	15	10	0.4	0.01	0.5
33	1.00330	114	25	10	0.4	0.01	0.5
34	1.00541	167	25	25	0.0	0.01	1.5
35	1.00612	69	15	25	0.0	0.01	1.5
36	1.00651	18	15	10	0.0	0.05	0.5
37	1.00678	265	40	25	0.0	0.01	1.5
38	1.00725	15	15	10	0.0	0.01	0.5
39	1.00837	216	40	10	0.0	0.01	1.5
40	1.00842	118	25	10	0.0	0.01	1.5
41	1.00990	260	40	25	0.0	0.01	0.5
42	1.02061	20	15	10	0.0	0.01	1.5

TABLE 1 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RTSE WITHIN EACH GROUP 4

RHO=0.75

RANK	RTSE	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.96226	120	25	10	0.0	0.01	0.5
2	0.96416	22	15	10	0.0	0.01	0.5
3	0.96498	76	15	25	0.0	0.01	1.5
4	0.96532	71	15	25	0.0	0.01	0.5
5	0.96672	125	25	10	0.0	0.01	1.5
6	0.97087	25	15	10	0.0	0.05	0.5
7	0.97177	123	25	10	0.0	0.05	0.5
8	0.97222	74	15	25	0.0	0.05	0.5
9	0.97242	27	15	10	0.0	0.01	1.5
10	0.98045	23	15	10	0.4	0.01	0.5
11	0.98160	218	40	10	0.0	0.01	0.5
12	0.98174	72	15	25	0.4	0.01	0.5
13	0.98339	121	25	10	0.4	0.01	0.5
14	0.98387	169	25	25	0.0	0.01	0.5
15	0.98527	75	15	25	0.0	0.20	0.5
16	0.98760	223	40	10	0.0	0.01	1.5
17	0.98864	172	25	25	0.0	0.05	0.5
18	0.98885	124	25	10	0.0	0.20	0.5
19	0.98904	174	25	25	0.0	0.01	1.5
20	0.98973	26	15	10	0.0	0.20	0.5
21	0.98980	267	40	25	0.0	0.01	0.5
22	0.99020	221	40	10	0.0	0.05	0.5
23	0.99298	219	40	10	0.4	0.01	0.5
24	0.99326	24	15	10	0.8	0.01	0.5
25	0.99462	170	25	25	0.4	0.01	0.5
26	0.99602	173	25	25	0.0	0.20	0.5
27	0.99604	222	40	10	0.0	0.20	0.5
28	0.99635	73	15	25	0.8	0.01	0.5
29	0.99755	77	15	25	0.8	0.01	1.5
30	0.99794	271	40	25	0.0	0.20	0.5
31	0.99925	28	15	10	0.8	0.01	1.5
32	1.00000	122	25	10	0.8	0.01	0.5
33	1.00000	171	25	25	0.8	0.01	0.5
34	1.00000	175	25	25	0.8	0.01	1.5
35	1.00000	220	40	10	0.8	0.01	0.5
36	1.00000	268	40	25	0.4	0.01	0.5
37	1.00000	269	40	25	0.8	0.01	0.5
38	1.00000	270	40	25	0.0	0.05	0.5
39	1.00082	126	25	10	0.8	0.01	1.5
40	1.00082	224	40	10	0.8	0.01	1.5
41	1.00131	273	40	25	0.8	0.01	1.5
42	1.00352	272	40	25	0.0	0.01	1.5

TABLE 1 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RTSE WITHIN EACH GROUP 5

RHO=0.9

RANK	RTSE	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.89716	29	15	10	0.0	0.01	0.5
2	0.90154	34	15	10	0.0	0.01	1.5
3	0.91346	32	15	10	0.0	0.05	0.5
4	0.92697	78	15	25	0.0	0.01	0.5
5	0.92979	83	15	25	0.0	0.01	1.5
6	0.94393	127	25	10	0.0	0.01	0.5
7	0.94413	30	15	10	0.4	0.01	0.5
8	0.94570	81	15	25	0.0	0.05	0.5
9	0.94836	132	25	10	0.0	0.01	1.5
10	0.95565	130	25	10	0.0	0.05	0.5
11	0.95911	33	15	10	0.0	0.20	0.5
12	0.96183	176	25	25	0.0	0.01	0.5
13	0.96525	230	40	10	0.0	0.01	1.5
14	0.96552	225	40	10	0.0	0.01	0.5
15	0.96804	79	15	25	0.4	0.01	0.5
16	0.97403	181	25	25	0.0	0.01	1.5
17	0.97593	82	15	25	0.0	0.20	0.5
18	0.97653	228	40	10	0.0	0.05	0.5
19	0.97980	279	40	25	0.0	0.01	1.5
20	0.98039	274	40	25	0.0	0.01	0.5
21	0.98077	128	25	10	0.4	0.01	0.5
22	0.98131	131	25	10	0.0	0.20	0.5
23	0.98343	179	25	25	0.0	0.05	0.5
24	0.98571	226	40	10	0.4	0.01	0.5
25	0.98618	31	15	10	0.8	0.01	0.5
26	0.98693	35	15	10	0.8	0.01	1.5
27	0.98734	277	40	25	0.0	0.05	0.5
28	0.98974	177	25	25	0.4	0.01	0.5
29	0.99014	180	25	25	0.0	0.20	0.5
30	0.99018	229	40	10	0.0	0.20	0.5
31	0.99273	80	15	25	0.8	0.01	0.5
32	0.99385	278	40	25	0.0	0.20	0.5
33	0.99422	275	40	25	0.4	0.01	0.5
34	0.99634	84	15	25	0.8	0.01	1.5
35	0.99758	129	25	10	0.8	0.01	0.5
36	0.99839	133	25	10	0.8	0.01	1.5
37	0.99878	182	25	25	0.8	0.01	1.5
38	0.99918	231	40	10	0.8	0.01	1.5
39	1.00000	178	25	25	0.8	0.01	0.5
40	1.00000	227	40	10	0.8	0.01	0.5
41	1.00000	276	40	25	0.8	0.01	0.5
42	1.00000	280	40	25	0.8	0.01	1.5

TABLE 1 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RTSE WITHIN EACH GROUP

RHO=0.95

RANK	RTSE	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.904059	36	15	10	0.0	0.01	0.5
2	0.908416	41	15	10	0.0	0.01	1.5
3	0.918660	134	25	10	0.0	0.01	0.5
4	0.920792	39	15	10	0.0	0.05	0.5
5	0.922156	85	15	25	0.0	0.01	0.5
6	0.922705	139	25	10	0.0	0.01	1.5
7	0.931313	90	15	25	0.0	0.01	1.5
8	0.937888	232	40	10	0.0	0.01	0.5
9	0.938525	137	25	10	0.0	0.05	0.5
10	0.941545	237	40	10	0.0	0.01	1.5
11	0.943396	88	15	25	0.0	0.05	0.5
12	0.944444	183	25	25	0.0	0.01	0.5
13	0.948787	188	25	25	0.0	0.01	1.5
14	0.950867	37	15	10	0.4	0.01	0.5
15	0.960396	235	40	10	0.0	0.05	0.5
16	0.962457	40	15	10	0.0	0.20	0.5
17	0.962617	86	15	25	0.4	0.01	0.5
18	0.965190	135	25	10	0.4	0.01	0.5
19	0.965636	286	40	25	0.0	0.01	1.5
20	0.966102	186	25	25	0.0	0.05	0.5
21	0.970000	281	40	25	0.0	0.01	0.5
22	0.973684	184	25	25	0.4	0.01	0.5
23	0.973881	89	15	25	0.0	0.20	0.5
24	0.975610	138	25	10	0.0	0.20	0.5
25	0.979021	233	40	10	0.4	0.01	0.5
26	0.980892	284	40	25	0.0	0.05	0.5
27	0.984221	187	25	25	0.0	0.20	0.5
28	0.986637	38	15	10	0.8	0.01	0.5
29	0.987879	282	40	25	0.4	0.01	0.5
30	0.988095	236	40	10	0.0	0.20	0.5
31	0.988848	87	15	25	0.8	0.01	0.5
32	0.989568	42	15	10	0.8	0.01	1.5
33	0.991786	285	40	25	0.0	0.20	0.5
34	0.993135	136	25	10	0.8	0.01	0.5
35	0.993758	91	15	25	0.8	0.01	1.5
36	0.994652	140	25	10	0.8	0.01	1.5
37	0.995316	234	40	10	0.8	0.01	0.5
38	0.995902	283	40	25	0.8	0.01	0.5
39	0.996139	189	25	25	0.8	0.01	1.5
40	0.996169	185	25	25	0.8	0.01	0.5
41	0.997647	238	40	10	0.8	0.01	1.5
42	0.998621	287	40	25	0.8	0.01	1.5

TABLE 1 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RTSE WITHIN EACH GROUP

RHO=0.989

RANK	RTSE	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.860548	48	15	10	0.0	0.01	1.5
2	0.861210	43	15	10	0.0	0.01	0.5
3	0.864706	92	15	25	0.0	0.01	0.5
4	0.864811	97	15	25	0.0	0.01	1.5
5	0.874396	141	25	10	0.0	0.01	0.5
6	0.876823	146	25	10	0.0	0.01	1.5
7	0.881002	244	40	10	0.0	0.01	1.5
8	0.882716	239	40	10	0.0	0.01	0.5
9	0.884984	46	15	10	0.0	0.05	0.5
10	0.893506	195	25	25	0.0	0.01	1.5
11	0.900000	190	25	25	0.0	0.01	0.5
12	0.905350	144	25	10	0.0	0.05	0.5
13	0.905724	293	40	25	0.0	0.01	1.5
14	0.911628	95	15	25	0.0	0.05	0.5
15	0.911765	288	40	25	0.0	0.01	0.5
16	0.926471	242	40	10	0.0	0.05	0.5
17	0.928571	44	15	10	0.4	0.01	0.5
18	0.932127	93	15	25	0.4	0.01	0.5
19	0.943820	193	25	25	0.0	0.05	0.5
20	0.944984	142	25	10	0.4	0.01	0.5
21	0.947723	47	15	10	0.0	0.20	0.5
22	0.958333	191	25	25	0.4	0.01	0.5
23	0.961783	291	40	25	0.0	0.05	0.5
24	0.964945	96	15	25	0.0	0.20	0.5
25	0.965870	240	40	10	0.4	0.01	0.5
26	0.968105	145	25	10	0.0	0.20	0.5
27	0.972376	289	40	25	0.4	0.01	0.5
28	0.973034	45	15	10	0.8	0.01	0.5
29	0.973704	49	15	10	0.8	0.01	1.5
30	0.980276	243	40	10	0.0	0.20	0.5
31	0.981227	98	15	25	0.8	0.01	1.5
32	0.981343	94	15	25	0.8	0.01	0.5
33	0.984032	194	25	25	0.0	0.20	0.5
34	0.985816	143	25	10	0.8	0.01	0.5
35	0.987342	147	25	10	0.8	0.01	1.5
36	0.987680	292	40	25	0.0	0.20	0.5
37	0.988679	192	25	25	0.8	0.01	0.5
38	0.991128	196	25	25	0.8	0.01	1.5
39	0.993994	245	40	10	0.8	0.01	1.5
40	0.995506	241	40	10	0.8	0.01	0.5
41	0.996203	294	40	25	0.8	0.01	1.5
42	0.996226	290	40	25	0.8	0.01	0.5

TABLE 2. Results of 294 experiments grouped by ρ and ranked within each group by RSET1,

Explanation

Because this table was printed on a line printer without lower case or Greek letters, necessitating the following notation changes were made:

Text notation	Equivalent table notation
ρ	RHO
N	NB
n	NY
ρ_c	RHO_C
$\sigma(\zeta_j)$	SD_ZETA
β_2	BETA_2

In all experiments,

$$\sigma(\eta_j)=\sigma(\zeta_j)$$

$$\beta_o=0.$$

$$\beta_1=1.$$

TABLE 2 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RSET1 WITHIN EACH GROUP 1

RHO=0

RANK	RSET1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	1.00000	101	25	10	0.8	0.01	0.5
2	1.00000	248	40	25	0.8	0.01	0.5
3	1.00000	249	40	25	0.0	0.05	0.5
4	1.00000	250	40	25	0.0	0.20	0.5
5	1.00000	252	40	25	0.8	0.01	1.5
6	1.00127	154	25	25	0.8	0.01	1.5
7	1.00159	105	25	10	0.8	0.01	1.5
8	1.00165	203	40	10	0.8	0.01	1.5
9	1.00197	201	40	10	0.0	0.20	0.5
10	1.00198	152	25	25	0.0	0.20	0.5
11	1.00248	199	40	10	0.8	0.01	0.5
12	1.00357	198	40	10	0.4	0.01	0.5
13	1.00358	52	15	25	0.8	0.01	0.5
14	1.00360	56	15	25	0.8	0.01	1.5
15	1.00375	103	25	10	0.0	0.20	0.5
16	1.00380	150	25	25	0.8	0.01	0.5
17	1.00455	51	15	25	0.4	0.01	0.5
18	1.00485	3	15	10	0.8	0.01	0.5
19	1.00495	99	25	10	0.0	0.01	0.5
20	1.00512	5	15	10	0.0	0.20	0.5
21	1.00535	149	25	25	0.4	0.01	0.5
22	1.00541	247	40	25	0.4	0.01	0.5
23	1.00575	151	25	25	0.0	0.05	0.5
24	1.00599	197	40	10	0.0	0.01	0.5
25	1.00649	7	15	10	0.8	0.01	1.5
26	1.00651	100	25	10	0.4	0.01	0.5
27	1.00813	148	25	25	0.0	0.01	0.5
28	1.00837	102	25	10	0.0	0.05	0.5
29	1.00929	54	15	25	0.0	0.20	0.5
30	1.00943	53	15	25	0.0	0.05	0.5
31	1.00966	200	40	10	0.0	0.05	0.5
32	1.01010	246	40	25	0.0	0.01	0.5
33	1.01045	251	40	25	0.0	0.01	1.5
34	1.01381	153	25	25	0.0	0.01	1.5
35	1.01524	2	15	10	0.4	0.01	0.5
36	1.01619	202	40	10	0.0	0.01	1.5
37	1.01807	50	15	25	0.0	0.01	0.5
38	1.01833	104	25	10	0.0	0.01	1.5
39	1.01993	4	15	10	0.0	0.05	0.5
40	1.02117	6	15	10	0.0	0.01	1.5
41	1.02230	1	15	10	0.0	0.01	0.5
42	1.02434	55	15	25	0.0	0.01	1.5

TABLE 2 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RSET1 WITHIN EACH GROUP

RHO=0.249

RANK	RSET1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.98925	8	15	10	0.0	0.01	0.5
2	0.99320	12	15	10	0.0	0.20	0.5
3	0.99351	11	15	10	0.0	0.05	0.5
4	0.99432	9	15	10	0.4	0.01	0.5
5	0.99524	207	40	10	0.0	0.05	0.5
6	0.99648	205	40	10	0.4	0.01	0.5
7	0.99656	107	25	10	0.4	0.01	0.5
8	0.99767	10	15	10	0.8	0.01	0.5
9	0.99796	257	40	25	0.0	0.20	0.5
10	0.99802	159	25	25	0.0	0.20	0.5
11	0.99812	110	25	10	0.0	0.20	0.5
12	1.00000	57	15	25	0.0	0.01	0.5
13	1.00000	58	15	25	0.4	0.01	0.5
14	1.00000	59	15	25	0.8	0.01	0.5
15	1.00000	60	15	25	0.0	0.05	0.5
16	1.00000	61	15	25	0.0	0.20	0.5
17	1.00000	106	25	10	0.0	0.01	0.5
18	1.00000	108	25	10	0.8	0.01	0.5
19	1.00000	109	25	10	0.0	0.05	0.5
20	1.00000	111	25	10	0.0	0.01	1.5
21	1.00000	155	25	25	0.0	0.01	0.5
22	1.00000	156	25	25	0.4	0.01	0.5
23	1.00000	157	25	25	0.8	0.01	0.5
24	1.00000	158	25	25	0.0	0.05	0.5
25	1.00000	204	40	10	0.0	0.01	0.5
26	1.00000	206	40	10	0.8	0.01	0.5
27	1.00000	208	40	10	0.0	0.20	0.5
28	1.00000	253	40	25	0.0	0.01	0.5
29	1.00000	254	40	25	0.4	0.01	0.5
30	1.00000	255	40	25	0.8	0.01	0.5
31	1.00000	256	40	25	0.0	0.05	0.5
32	1.00079	210	40	10	0.8	0.01	1.5
33	1.00127	63	15	25	0.8	0.01	1.5
34	1.00128	161	25	25	0.8	0.01	1.5
35	1.00133	259	40	25	0.8	0.01	1.5
36	1.00156	14	15	10	0.8	0.01	1.5
37	1.00164	112	25	10	0.8	0.01	1.5
38	1.00361	13	15	10	0.0	0.01	1.5
39	1.00396	209	40	10	0.0	0.01	1.5
40	1.00667	258	40	25	0.0	0.01	1.5
41	1.00792	160	25	25	0.0	0.01	1.5
42	1.01152	62	15	25	0.0	0.01	1.5

TABLE 2 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RSET1 WITHIN EACH GROUP

------------------------------ RHO=0.5 ------------------------------

RANK	RSET1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.97000	15	15	10	0.0	0.01	0.5
2	0.97568	18	15	10	0.0	0.05	0.5
3	0.97696	113	25	10	0.0	0.01	0.5
4	0.97788	67	15	25	0.0	0.05	0.5
5	0.97826	64	15	25	0.0	0.01	0.5
6	0.97855	19	15	10	0.0	0.20	0.5
7	0.98014	68	15	25	0.0	0.20	0.5
8	0.98024	116	25	10	0.0	0.05	0.5
9	0.98061	16	15	10	0.4	0.01	0.5
10	0.98286	211	40	10	0.0	0.01	0.5
11	0.98540	162	25	25	0.0	0.01	0.5
12	0.98611	214	40	10	0.0	0.05	0.5
13	0.98701	65	15	25	0.4	0.01	0.5
14	0.98764	118	25	10	0.0	0.01	1.5
15	0.98903	69	15	25	0.0	0.01	1.5
16	0.98996	20	15	10	0.0	0.01	1.5
17	0.99051	114	25	10	0.4	0.01	0.5
18	0.99079	117	25	10	0.0	0.20	0.5
19	0.99383	263	40	25	0.0	0.05	0.5
20	0.99414	166	25	25	0.0	0.20	0.5
21	0.99420	215	40	10	0.0	0.20	0.5
22	0.99423	216	40	10	0.0	0.01	1.5
23	0.99459	165	25	25	0.0	0.05	0.5
24	0.99495	163	25	25	0.4	0.01	0.5
25	0.99529	17	15	10	0.8	0.01	0.5
26	0.99632	164	25	25	0.8	0.01	0.5
27	0.99659	212	40	10	0.4	0.01	0.5
28	0.99685	265	40	25	0.0	0.01	1.5
29	0.99686	21	15	10	0.8	0.01	1.5
30	0.99752	167	25	25	0.0	0.01	1.5
31	0.99761	213	40	10	0.8	0.01	0.5
32	0.99761	115	25	10	0.8	0.01	0.5
33	0.99796	264	40	25	0.0	0.20	0.5
34	0.99878	70	15	25	0.8	0.01	1.5
35	1.00000	66	15	25	0.8	0.01	0.5
36	1.00000	119	25	10	0.8	0.01	1.5
37	1.00000	217	40	10	0.8	0.01	1.5
38	1.00000	260	40	25	0.0	0.01	0.5
39	1.00000	261	40	25	0.4	0.01	0.5
40	1.00000	262	40	25	0.8	0.01	0.5
41	1.00124	168	25	25	0.8	0.01	1.5
42	1.00130	266	40	25	0.8	0.01	1.5

TABLE 2 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RSET1 WITHIN EACH GROUP

RHO=0.75

RANK	RSET1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.88056	22	15	10	0.0	0.01	0.5
2	0.89119	25	15	10	0.0	0.05	0.5
3	0.89879	27	15	10	0.0	0.01	1.5
4	0.91756	120	25	10	0.0	0.01	0.5
5	0.92140	71	15	25	0.0	0.01	0.5
6	0.92553	26	15	10	0.0	0.20	0.5
7	0.92557	125	25	10	0.0	0.01	1.5
8	0.92891	23	15	10	0.4	0.01	0.5
9	0.92926	123	25	10	0.0	0.05	0.5
10	0.92962	76	15	25	0.0	0.01	1.5
11	0.93284	74	15	25	0.0	0.05	0.5
12	0.94762	218	40	10	0.0	0.01	0.5
13	0.94825	75	15	25	0.0	0.20	0.5
14	0.95510	221	40	10	0.0	0.05	0.5
15	0.95758	169	25	25	0.0	0.01	0.5
16	0.95770	124	25	10	0.0	0.20	0.5
17	0.95785	72	15	25	0.4	0.01	0.5
18	0.95840	223	40	10	0.0	0.01	1.5
19	0.95965	121	25	10	0.4	0.01	0.5
20	0.96682	172	25	25	0.0	0.05	0.5
21	0.97137	174	25	25	0.0	0.01	1.5
22	0.97619	267	40	25	0.0	0.01	0.5
23	0.97765	173	25	25	0.0	0.20	0.5
24	0.97778	219	40	10	0.4	0.01	0.5
25	0.97940	222	40	10	0.0	0.20	0.5
26	0.98109	24	15	10	0.8	0.01	0.5
27	0.98140	170	25	25	0.4	0.01	0.5
28	0.98458	28	15	10	0.8	0.01	1.5
29	0.98876	270	40	25	0.0	0.05	0.5
30	0.98919	272	40	25	0.0	0.01	1.5
31	0.98980	73	15	25	0.8	0.01	0.5
32	0.99016	271	40	25	0.0	0.20	0.5
33	0.99059	122	25	10	0.8	0.01	0.5
34	0.99430	77	15	25	0.8	0.01	1.5
35	0.99492	268	40	25	0.4	0.01	0.5
36	0.99528	126	25	10	0.8	0.01	1.5
37	0.99617	171	25	25	0.8	0.01	0.5
38	0.99761	220	40	10	0.8	0.01	0.5
39	0.99840	224	40	10	0.8	0.01	1.5
40	0.99872	175	25	25	0.8	0.01	1.5
41	1.00000	269	40	25	0.8	0.01	0.5
42	1.00000	273	40	25	0.8	0.01	1.5

TABLE 2 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RSET1 WITHIN EACH GROUP

RHO=0.9

RANK	RSET1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.747610	29	15	10	0.0	0.01	0.5
2	0.760870	32	15	10	0.0	0.05	0.5
3	0.762788	34	15	10	0.0	0.01	1.5
4	0.812834	127	25	10	0.0	0.01	0.5
5	0.815412	30	15	10	0.4	0.01	0.5
6	0.820574	33	15	10	0.0	0.20	0.5
7	0.824107	132	25	10	0.0	0.01	1.5
8	0.827930	130	25	10	0.0	0.05	0.5
9	0.832317	78	15	25	0.0	0.01	0.5
10	0.843666	81	15	25	0.0	0.05	0.5
11	0.845445	83	15	25	0.0	0.01	1.5
12	0.864078	82	15	25	0.0	0.20	0.5
13	0.867550	225	40	10	0.0	0.01	0.5
14	0.877913	230	40	10	0.0	0.01	1.5
15	0.882883	228	40	10	0.0	0.05	0.5
16	0.884786	131	25	10	0.0	0.20	0.5
17	0.888554	79	15	25	0.4	0.01	0.5
18	0.896104	176	25	25	0.0	0.01	0.5
19	0.897862	128	25	10	0.4	0.01	0.5
20	0.908425	179	25	25	0.0	0.05	0.5
21	0.920058	181	25	25	0.0	0.01	1.5
22	0.926471	229	40	10	0.0	0.20	0.5
23	0.928808	180	25	25	0.0	0.20	0.5
24	0.931429	274	40	25	0.0	0.01	0.5
25	0.932584	31	15	10	0.8	0.01	0.5
26	0.933884	226	40	10	0.4	0.01	0.5
27	0.938712	35	15	10	0.8	0.01	1.5
28	0.942966	177	25	25	0.4	0.01	0.5
29	0.946050	279	40	25	0.0	0.01	1.5
30	0.950000	277	40	25	0.0	0.05	0.5
31	0.956522	278	40	25	0.0	0.20	0.5
32	0.965066	275	40	25	0.4	0.01	0.5
33	0.966463	80	15	25	0.8	0.01	0.5
34	0.973388	84	15	25	0.8	0.01	1.5
35	0.974194	129	25	10	0.8	0.01	0.5
36	0.981322	133	25	10	0.8	0.01	1.5
37	0.986395	227	40	10	0.8	0.01	0.5
38	0.986711	178	25	25	0.8	0.01	0.5
39	0.990152	231	40	10	0.8	0.01	1.5
40	0.992196	182	25	25	0.8	0.01	1.5
41	0.992647	276	40	25	0.8	0.01	0.5
42	0.997534	280	40	25	0.8	0.01	1.5

TABLE 2 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RSET1 WITHIN EACH GROUP 6

RHO=0.95

RANK	RSET1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.665625	36	15	10	0.0	0.01	0.5
2	0.682090	39	15	10	0.0	0.05	0.5
3	0.694676	41	15	10	0.0	0.01	1.5
4	0.717842	134	25	10	0.0	0.01	0.5
5	0.734893	137	25	10	0.0	0.05	0.5
6	0.744511	40	15	10	0.0	0.20	0.5
7	0.747222	139	25	10	0.0	0.01	1.5
8	0.749201	37	15	10	0.4	0.01	0.5
9	0.755611	85	15	25	0.0	0.01	0.5
10	0.772727	88	15	25	0.0	0.05	0.5
11	0.777480	232	40	10	0.0	0.01	0.5
12	0.777778	237	40	10	0.0	0.01	1.5
13	0.789988	89	15	25	0.0	0.20	0.5
14	0.798507	235	40	10	0.0	0.05	0.5
15	0.799167	90	15	25	0.0	0.01	1.5
16	0.800995	138	25	10	0.0	0.20	0.5
17	0.813084	135	25	10	0.4	0.01	0.5
18	0.814433	183	25	25	0.0	0.01	0.5
19	0.825758	86	15	25	0.4	0.01	0.5
20	0.834320	186	25	25	0.0	0.05	0.5
21	0.843931	188	25	25	0.0	0.01	1.5
22	0.858757	187	25	25	0.0	0.20	0.5
23	0.868035	236	40	10	0.0	0.20	0.5
24	0.870536	281	40	25	0.0	0.01	0.5
25	0.874142	233	40	10	0.4	0.01	0.5
26	0.881203	286	40	25	0.0	0.01	1.5
27	0.892166	184	25	25	0.4	0.01	0.5
28	0.888989	284	40	25	0.0	0.05	0.5
29	0.895369	38	15	10	0.8	0.01	0.5
30	0.904298	42	15	10	0.8	0.01	1.5
31	0.907618	285	40	25	0.0	0.20	0.5
32	0.926357	282	40	25	0.4	0.01	0.5
33	0.933518	87	15	25	0.8	0.01	0.5
34	0.935305	136	25	10	0.8	0.01	0.5
35	0.941939	140	25	10	0.8	0.01	1.5
36	0.945269	91	15	25	0.8	0.01	1.5
37	0.965795	234	40	10	0.8	0.01	0.5
38	0.966154	185	25	25	0.8	0.01	0.5
39	0.967070	238	40	10	0.8	0.01	1.5
40	0.970041	189	25	25	0.8	0.01	1.5
41	0.982517	283	40	25	0.8	0.01	0.5
42	0.988263	287	40	25	0.8	0.01	1.5

TABLE 2 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RSET1 WITHIN EACH GROUP

-- RHO=0.989 --

RANK	RSET1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.514388	43	15	10	0.0	0.01	0.5
2	0.525295	46	15	10	0.0	0.05	0.5
3	0.529596	48	15	10	0.0	0.01	1.5
4	0.532869	141	25	10	0.0	0.01	0.5
5	0.546770	144	25	10	0.0	0.05	0.5
6	0.547101	92	15	25	0.0	0.01	0.5
7	0.563062	146	25	10	0.0	0.01	1.5
8	0.564132	95	15	25	0.0	0.05	0.5
9	0.566110	239	40	10	0.0	0.01	0.5
10	0.573132	44	15	10	0.4	0.01	0.5
11	0.574502	47	15	10	0.0	0.20	0.5
12	0.582200	242	40	10	0.0	0.05	0.5
13	0.582426	97	15	25	0.0	0.01	1.5
14	0.595197	244	40	10	0.0	0.01	1.5
15	0.605519	190	25	25	0.0	0.01	0.5
16	0.607095	96	15	25	0.0	0.20	0.5
17	0.612821	93	15	25	0.4	0.01	0.5
18	0.614300	142	25	10	0.4	0.01	0.5
19	0.614889	145	25	10	0.0	0.20	0.5
20	0.625194	193	25	25	0.0	0.05	0.5
21	0.643243	195	25	25	0.0	0.01	1.5
22	0.656184	288	40	25	0.0	0.01	0.5
23	0.662953	194	25	25	0.0	0.20	0.5
24	0.671070	240	40	10	0.4	0.01	0.5
25	0.671076	243	40	10	0.0	0.20	0.5
26	0.672062	293	40	25	0.0	0.01	1.5
27	0.672348	291	40	25	0.0	0.05	0.5
28	0.679376	191	25	25	0.4	0.01	0.5
29	0.706721	45	15	10	0.8	0.01	0.5
30	0.709524	49	15	10	0.8	0.01	1.5
31	0.729701	292	40	25	0.0	0.20	0.5
32	0.752155	289	40	25	0.4	0.01	0.5
33	0.765625	94	15	25	0.8	0.01	0.5
34	0.776197	143	25	10	0.8	0.01	0.5
35	0.784302	98	15	25	0.8	0.01	1.5
36	0.787565	147	25	10	0.8	0.01	1.5
37	0.849462	192	25	25	0.8	0.01	0.5
38	0.851796	241	40	10	0.8	0.01	0.5
39	0.856219	196	25	25	0.8	0.01	1.5
40	0.862706	245	40	10	0.8	0.01	1.5
41	0.904762	290	40	25	0.8	0.01	0.5
42	0.906198	294	40	25	0.8	0.01	1.5

TABLE 3. Results of 294 experiments grouped by ρ and ranked within each group by RB1.

Explanation

Because this table was printed on a line printer without lower case or Greek letters, the following notation changes were made:

Text notation	Equivalent table notation
ρ	RHO
N	NB
n	NY
ρ_c	RHO_C
$\sigma(\zeta_j)$	SD_ZETA
β_2	BETA_2

In all experiments,

$$\sigma(\eta_j)=\sigma(\zeta_j)$$

$$\beta_0=0.$$

$$\beta_1=1.$$

TABLE 3 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB1 WITHIN EACH GROUP

RHO=0

RANK	RB1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.91585	6	15	10	0.0	0.01	1.5
2	0.94497	104	25	10	0.0	0.01	1.5
3	0.95841	55	15	25	0.0	0.01	1.5
4	0.97461	202	40	10	0.0	0.01	1.5
5	0.97947	7	15	10	0.8	0.01	1.5
6	0.97975	153	25	25	0.0	0.01	1.5
7	0.98928	105	25	10	0.8	0.01	1.5
8	0.99051	56	15	25	0.8	0.01	1.5
9	0.99327	203	40	10	0.8	0.01	1.5
10	0.99346	251	40	25	0.0	0.01	1.5
11	0.99415	252	40	25	0.8	0.01	1.5
12	0.99574	154	25	25	0.8	0.01	0.5
13	1.00000	50	15	25	0.0	0.01	0.5
14	1.00000	52	15	25	0.8	0.01	0.5
15	1.00000	150	25	25	0.8	0.01	0.5
16	1.00518	53	15	25	0.0	0.05	0.5
17	1.00606	51	15	25	0.4	0.01	0.5
18	1.00917	102	25	10	0.0	0.05	0.5
19	1.00926	249	40	25	0.0	0.05	0.5
20	1.00943	99	25	10	0.0	0.01	0.5
21	1.00971	246	40	25	0.0	0.01	0.5
22	1.01010	199	40	10	0.8	0.01	0.5
23	1.01087	247	40	25	0.4	0.01	0.5
24	1.01307	198	40	10	0.4	0.01	0.5
25	1.01471	151	25	25	0.0	0.05	0.5
26	1.01527	148	25	25	0.0	0.01	0.5
27	1.01613	101	25	10	0.8	0.01	0.5
28	1.01653	149	25	25	0.4	0.01	0.5
29	1.01724	200	40	10	0.0	0.05	0.5
30	1.01754	197	40	10	0.0	0.01	0.5
31	1.01754	248	40	25	0.8	0.01	0.5
32	1.01905	201	40	10	0.0	0.20	0.5
33	1.02094	100	25	10	0.4	0.01	0.5
34	1.02143	103	25	10	0.0	0.20	0.5
35	1.02314	5	15	10	0.0	0.20	0.5
36	1.02439	250	40	25	0.0	0.20	0.5
37	1.02454	3	15	10	0.8	0.01	0.5
38	1.02572	4	15	10	0.0	0.05	0.5
39	1.02623	1	15	10	0.0	0.01	0.5
40	1.02632	2	15	10	0.4	0.01	0.5
41	1.02830	152	25	25	0.0	0.20	0.5
42	1.03020	54	15	25	0.0	0.20	0.5

TABLE 3 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB1 WITHIN EACH GROUP

RHO=0.249

RANK	RB1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.88639	13	15	10	0.0	0.01	1.5
2	0.92018	111	25	10	0.0	0.01	1.5
3	0.93976	14	15	10	0.8	0.01	1.5
4	0.94477	209	40	10	0.0	0.01	1.5
5	0.95000	62	15	25	0.0	0.01	1.5
6	0.95065	12	15	10	0.0	0.20	0.5
7	0.96190	11	15	10	0.0	0.05	0.5
8	0.96765	8	15	10	0.0	0.01	0.5
9	0.96897	160	25	25	0.0	0.01	1.5
10	0.96931	112	25	10	0.8	0.01	1.5
11	0.97778	9	15	10	0.4	0.01	0.5
12	0.97799	258	40	25	0.0	0.01	1.5
13	0.98174	159	25	25	0.0	0.20	0.5
14	0.98182	210	40	10	0.8	0.01	1.5
15	0.98193	63	15	25	0.8	0.01	1.5
16	0.98418	61	15	25	0.0	0.20	0.5
17	0.98571	155	25	25	0.0	0.01	0.5
18	0.98592	110	25	10	0.0	0.20	0.5
19	0.98630	158	25	25	0.0	0.05	0.5
20	0.98795	10	15	10	0.8	0.01	0.5
21	0.98969	57	15	25	0.0	0.01	0.5
22	0.99020	60	15	25	0.0	0.05	0.5
23	0.99065	208	40	10	0.0	0.20	0.5
24	0.99065	253	40	25	0.0	0.01	0.5
25	0.99145	161	25	25	0.8	0.01	1.5
26	0.99194	156	25	25	0.4	0.01	0.5
27	0.99408	204	40	10	0.0	0.01	0.5
28	0.99415	207	40	10	0.0	0.05	0.5
29	0.99425	259	40	25	0.8	0.01	1.5
30	0.99444	257	40	25	0.0	0.20	0.5
31	0.99550	106	25	10	0.0	0.01	0.5
32	0.99558	109	25	10	0.0	0.05	0.5
33	1.00000	58	15	25	0.4	0.01	0.5
34	1.00000	59	15	25	0.8	0.01	0.5
35	1.00000	107	25	10	0.4	0.01	0.5
36	1.00000	108	25	10	0.8	0.01	0.5
37	1.00000	157	25	25	0.8	0.01	0.5
38	1.00000	205	40	10	0.4	0.01	0.5
39	1.00000	206	40	10	0.8	0.01	0.5
40	1.00000	254	40	25	0.4	0.01	0.5
41	1.00000	255	40	25	0.8	0.01	0.5
42	1.00000	256	40	25	0.0	0.05	0.5

TABLE 3 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB1 WITHIN EACH GROUP

RHO=0.5

RANK	RB1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.85465	20	15	10	0.0	0.01	1.5
2	0.89045	118	25	10	0.0	0.01	1.5
3	0.90313	68	15	25	0.0	0.20	0.5
4	0.90531	19	15	10	0.0	0.20	0.5
5	0.90881	69	15	25	0.0	0.01	1.5
6	0.92440	216	40	10	0.0	0.01	1.5
7	0.93144	21	15	10	0.8	0.01	1.5
8	0.93429	18	15	10	0.0	0.05	0.5
9	0.93895	15	15	10	0.0	0.01	0.5
10	0.93930	117	25	10	0.0	0.20	0.5
11	0.94737	67	15	25	0.0	0.05	0.5
12	0.94758	166	25	25	0.0	0.20	0.5
13	0.94862	215	40	10	0.0	0.20	0.5
14	0.94953	16	15	10	0.4	0.01	0.5
15	0.94977	64	15	25	0.0	0.01	0.5
16	0.95798	113	25	10	0.0	0.01	0.5
17	0.95815	167	25	25	0.0	0.01	1.5
18	0.95853	119	25	10	0.8	0.01	1.5
19	0.95897	65	15	25	0.4	0.01	0.5
20	0.95902	116	25	10	0.0	0.05	0.5
21	0.96000	70	15	25	0.8	0.01	1.5
22	0.96413	114	25	10	0.4	0.01	0.5
23	0.96465	214	40	10	0.0	0.05	0.5
24	0.96907	211	40	10	0.0	0.01	0.5
25	0.97101	265	40	25	0.0	0.01	1.5
26	0.97305	217	40	10	0.8	0.01	1.5
27	0.97368	162	25	25	0.0	0.01	0.5
28	0.97484	165	25	25	0.0	0.05	0.5
29	0.97701	212	40	10	0.4	0.01	0.5
30	0.97761	163	25	25	0.4	0.01	0.5
31	0.97814	264	40	25	0.0	0.20	0.5
32	0.97990	17	15	10	0.8	0.01	0.5
33	0.98400	66	15	25	0.8	0.01	0.5
34	0.98444	168	25	25	0.8	0.01	1.5
35	0.98621	115	25	10	0.8	0.01	0.5
36	0.98837	164	25	25	0.8	0.01	0.5
37	0.98947	266	40	25	0.8	0.01	1.5
38	0.99000	261	40	25	0.4	0.01	0.5
39	0.99099	213	40	10	0.8	0.01	0.5
40	0.99130	260	40	25	0.0	0.01	0.5
41	0.99160	263	40	25	0.0	0.05	0.5
42	1.00000	262	40	25	0.8	0.01	0.5

TABLE 3 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB1 WITHIN EACH GROUP

RHO=0.75

RANK	RB1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.773218	27	15	10	0.0	0.01	1.5
2	0.795009	26	15	10	0.0	0.20	0.5
3	0.826281	75	15	25	0.0	0.20	0.5
4	0.830472	25	15	10	0.0	0.05	0.5
5	0.833333	22	15	10	0.0	0.01	0.5
6	0.848659	125	25	10	0.0	0.01	1.5
7	0.852041	23	15	10	0.4	0.01	0.5
8	0.856818	124	25	10	0.0	0.20	0.5
9	0.856970	76	15	25	0.0	0.01	1.5
10	0.863818	28	15	10	0.8	0.01	1.5
11	0.886525	74	15	25	0.0	0.05	0.5
12	0.886731	222	40	10	0.0	0.20	0.5
13	0.887640	123	25	10	0.0	0.05	0.5
14	0.888252	120	25	10	0.0	0.01	0.5
15	0.888457	223	40	10	0.0	0.01	1.5
16	0.888889	173	25	25	0.0	0.20	0.5
17	0.890511	71	15	25	0.0	0.01	0.5
18	0.903537	121	25	10	0.4	0.01	0.5
19	0.912000	24	15	10	0.8	0.01	0.5
20	0.913043	72	15	25	0.4	0.01	0.5
21	0.922179	218	40	10	0.0	0.01	0.5
22	0.922179	221	40	10	0.0	0.05	0.5
23	0.925040	174	25	25	0.0	0.01	1.5
24	0.926829	126	25	10	0.8	0.01	1.5
25	0.928000	271	40	25	0.0	0.20	0.5
26	0.938326	219	40	10	0.4	0.01	0.5
27	0.939815	172	25	25	0.0	0.05	0.5
28	0.942584	169	25	25	0.0	0.01	0.5
29	0.944882	77	15	25	0.8	0.01	1.5
30	0.950783	272	40	25	0.0	0.01	1.5
31	0.955556	170	25	25	0.4	0.01	0.5
32	0.957647	224	40	10	0.8	0.01	1.5
33	0.958333	122	25	10	0.8	0.01	0.5
34	0.959064	73	15	25	0.8	0.01	0.5
35	0.966667	267	40	25	0.0	0.01	0.5
36	0.968354	270	40	25	0.0	0.05	0.5
37	0.970803	268	40	25	0.4	0.01	0.5
38	0.971831	220	40	10	0.8	0.01	0.5
39	0.972892	175	25	25	0.8	0.01	0.5
40	0.981982	171	25	25	0.8	0.01	1.5
41	0.984791	273	40	25	0.8	0.01	0.5
42	0.988636	269	40	25	0.8	0.01	1.5

TABLE 3 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB1 WITHIN EACH GROUP

-- RHO=0.9 --

RANK	RB1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.691723	34	15	10	0.0	0.01	1.5
2	0.705021	33	15	10	0.0	0.20	0.5
3	0.716146	32	15	10	0.0	0.05	0.5
4	0.717537	29	15	10	0.0	0.01	0.5
5	0.729333	82	15	25	0.0	0.20	0.5
6	0.732484	131	25	10	0.0	0.20	0.5
7	0.733824	30	15	10	0.4	0.01	0.5
8	0.741391	132	25	10	0.0	0.01	1.5
9	0.776447	130	25	10	0.0	0.05	0.5
10	0.779352	127	25	10	0.0	0.01	0.5
11	0.789565	83	15	25	0.0	0.01	1.5
12	0.794059	180	25	25	0.0	0.20	0.5
13	0.796078	229	40	10	0.0	0.20	0.5
14	0.798419	81	15	25	0.0	0.05	0.5
15	0.799216	35	15	10	0.8	0.01	1.5
16	0.802993	230	40	10	0.0	0.01	1.5
17	0.808824	78	15	25	0.0	0.01	0.5
18	0.812207	128	25	10	0.4	0.01	0.5
19	0.818824	31	15	10	0.8	0.01	0.5
20	0.829630	79	15	25	0.4	0.01	0.5
21	0.835509	278	40	25	0.0	0.20	0.5
22	0.839024	228	40	10	0.0	0.05	0.5
23	0.842893	225	40	10	0.0	0.01	0.5
24	0.859701	226	40	10	0.4	0.01	0.5
25	0.861780	181	25	25	0.0	0.01	1.5
26	0.861862	179	25	25	0.0	0.05	0.5
27	0.869458	133	25	10	0.8	0.01	1.5
28	0.871473	176	25	25	0.0	0.01	0.5
29	0.883152	84	15	25	0.8	0.01	1.5
30	0.889299	177	25	25	0.4	0.01	0.5
31	0.893382	129	25	10	0.8	0.01	0.5
32	0.899194	80	15	25	0.8	0.01	0.5
33	0.909091	277	40	25	0.0	0.05	0.5
34	0.912664	279	40	25	0.0	0.01	1.5
35	0.913043	274	40	25	0.0	0.01	0.5
36	0.918367	231	40	10	0.8	0.01	1.5
37	0.929245	275	40	25	0.4	0.01	0.5
38	0.929577	227	40	10	0.8	0.01	0.5
39	0.939759	182	25	25	0.8	0.01	1.5
40	0.946108	178	25	25	0.8	0.01	0.5
41	0.963235	276	40	25	0.8	0.01	0.5
42	0.972772	280	40	25	0.8	0.01	1.5

TABLE 3 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB1 WITHIN EACH GROUP 6

RHO=0.95

RANK	RB1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.638554	89	15	25	0.0	0.20	0.5
2	0.650906	40	15	10	0.0	0.20	0.5
3	0.660566	41	15	10	0.0	0.01	1.5
4	0.664452	138	25	10	0.0	0.20	0.5
5	0.676653	36	15	10	0.0	0.01	0.5
6	0.678392	39	15	10	0.0	0.05	0.5
7	0.679668	139	25	10	0.0	0.01	1.5
8	0.690734	37	15	10	0.4	0.01	0.5
9	0.698864	137	25	10	0.0	0.05	0.5
10	0.702190	134	25	10	0.0	0.01	0.5
11	0.717066	236	40	10	0.0	0.20	0.5
12	0.721992	187	25	25	0.0	0.20	0.5
13	0.723596	90	15	25	0.0	0.01	1.5
14	0.725938	88	15	25	0.0	0.05	0.5
15	0.728672	42	15	10	0.8	0.01	1.5
16	0.733547	135	25	10	0.4	0.01	0.5
17	0.733558	85	15	25	0.0	0.01	0.5
18	0.742530	237	40	10	0.0	0.01	1.5
19	0.754789	38	15	10	0.8	0.01	0.5
20	0.758879	235	40	10	0.0	0.05	0.5
21	0.760000	232	40	10	0.0	0.01	0.5
22	0.764599	285	40	25	0.0	0.20	0.5
23	0.772816	86	15	25	0.4	0.01	0.5
24	0.787952	188	25	25	0.0	0.01	1.5
25	0.790150	233	40	10	0.4	0.01	0.5
26	0.790179	186	25	25	0.0	0.05	0.5
27	0.796163	183	25	25	0.0	0.01	0.5
28	0.806397	140	25	10	0.8	0.01	1.5
29	0.821159	136	25	10	0.8	0.01	0.5
30	0.821429	184	25	25	0.4	0.01	0.5
31	0.826923	286	40	25	0.0	0.01	1.5
32	0.842262	284	40	25	0.0	0.05	0.5
33	0.849000	91	15	25	0.8	0.01	1.5
34	0.849840	281	40	25	0.0	0.01	0.5
35	0.856287	87	15	25	0.8	0.01	0.5
36	0.858351	238	40	10	0.8	0.01	1.5
37	0.875433	282	40	25	0.4	0.01	0.5
38	0.879747	234	40	10	0.8	0.01	0.5
39	0.896599	189	25	25	0.8	0.01	1.5
40	0.902834	185	25	25	0.8	0.01	0.5
41	0.935829	283	40	25	0.8	0.01	0.5
42	0.940754	287	40	25	0.8	0.01	1.5

TABLE 3 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB1 WITHIN EACH GROUP

RHO=0.989

RANK	RB1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.579134	194	25	25	0.0	0.20	0.5
2	0.583571	48	15	10	0.0	0.01	1.5
3	0.583804	96	15	25	0.0	0.20	0.5
4	0.587265	46	15	10	0.0	0.05	0.5
5	0.587928	97	15	25	0.0	0.01	1.5
6	0.588263	43	15	10	0.0	0.01	0.5
7	0.592238	145	25	10	0.0	0.20	0.5
8	0.592796	92	15	25	0.0	0.01	0.5
9	0.595363	95	15	25	0.0	0.05	0.5
10	0.596780	47	15	10	0.0	0.20	0.5
11	0.608723	146	25	10	0.0	0.01	1.5
12	0.609239	44	15	10	0.4	0.01	0.5
13	0.610905	144	25	10	0.0	0.05	0.5
14	0.612374	141	25	10	0.0	0.01	0.5
15	0.619424	244	40	10	0.0	0.01	1.5
16	0.624752	243	40	10	0.0	0.20	0.5
17	0.624889	93	15	25	0.4	0.01	0.5
18	0.626978	242	40	10	0.0	0.05	0.5
19	0.627434	239	40	10	0.0	0.01	0.5
20	0.627491	142	25	10	0.4	0.01	0.5
21	0.632442	292	40	25	0.0	0.20	0.5
22	0.638396	195	25	25	0.0	0.01	1.5
23	0.639208	193	25	25	0.0	0.05	0.5
24	0.642400	49	15	10	0.8	0.01	1.5
25	0.644989	190	25	25	0.0	0.01	0.5
26	0.645594	240	40	10	0.4	0.01	0.5
27	0.654153	45	15	10	0.8	0.01	0.5
28	0.667078	191	25	25	0.4	0.01	0.5
29	0.667453	293	40	25	0.0	0.01	1.5
30	0.671602	291	40	25	0.0	0.05	0.5
31	0.673105	147	25	10	0.8	0.01	1.5
32	0.681917	143	25	10	0.8	0.01	0.5
33	0.683616	288	40	25	0.0	0.01	0.5
34	0.698355	98	15	25	0.8	0.01	1.5
35	0.705321	94	15	25	0.8	0.01	0.5
36	0.713645	245	40	10	0.8	0.01	1.5
37	0.727273	241	40	10	0.8	0.01	0.5
38	0.728571	289	40	25	0.4	0.01	0.5
39	0.758318	196	25	25	0.8	0.01	1.5
40	0.771536	192	25	25	0.8	0.01	0.5
41	0.807149	294	40	25	0.8	0.01	1.5
42	0.826303	290	40	25	0.3	0.01	0.5

TABLE 4. Results of 294 experiments grouped by ρ and ranked within each group by RB2.

Explanation

Because this table was printed on a line printer without lower case or Greek letters, the following notation changes were made:

Text notation	Equivalent table notation
ρ	RHO
N	NB
n	NY
ρ_c	RHO_C
$\sigma(\zeta_j)$	SD_ZETA
β_2	BETA_2

In all experiments,

$$\sigma(\eta_j)=\sigma(\zeta_j)$$

$$\beta_o=0.$$

$$\beta_1=1.$$

TABLE 4 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB2 WITHIN EACH GROUP 1

RHO=0

RANK	RB2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	1.00000	3	15	10	0.8	0.01	0.5
2	1.00000	101	25	10	0.8	0.01	0.5
3	1.00000	248	40	25	0.8	0.01	0.5
4	1.00398	199	40	10	0.8	0.01	0.5
5	1.00522	5	15	10	0.0	0.20	0.5
6	1.00588	252	40	25	0.8	0.01	1.5
7	1.00610	150	25	25	0.8	0.01	0.5
8	1.00671	149	25	25	0.4	0.01	0.5
9	1.00714	148	25	25	0.0	0.01	0.5
10	1.00758	247	40	25	0.4	0.01	0.5
11	1.00833	100	25	10	0.4	0.01	0.5
12	1.00866	201	40	10	0.0	0.20	0.5
13	1.00885	249	40	25	0.0	0.05	0.5
14	1.00943	246	40	25	0.0	0.01	0.5
15	1.00990	198	40	10	0.4	0.01	0.5
16	1.01093	52	15	25	0.8	0.01	0.5
17	1.01156	250	40	25	0.0	0.20	0.5
18	1.01351	151	25	25	0.0	0.05	0.5
19	1.01426	154	25	25	0.8	0.01	1.5
20	1.01630	200	40	10	0.0	0.05	0.5
21	1.01667	197	40	10	0.0	0.01	0.5
22	1.02101	105	25	10	0.8	0.01	1.5
23	1.02222	102	25	10	0.0	0.05	0.5
24	1.02255	203	40	10	0.8	0.01	1.5
25	1.02262	99	25	10	0.0	0.01	0.5
26	1.02518	103	25	10	0.0	0.20	0.5
27	1.02533	2	15	10	0.4	0.01	0.5
28	1.02643	152	25	25	0.0	0.20	0.5
29	1.02698	51	15	25	0.4	0.01	0.5
30	1.02737	56	15	25	0.8	0.01	1.5
31	1.02990	4	15	10	0.0	0.05	0.5
32	1.03077	53	15	25	0.0	0.05	0.5
33	1.03226	50	15	25	0.0	0.01	0.5
34	1.03754	1	15	10	0.0	0.01	1.5
35	1.03767	7	15	10	0.8	0.01	1.5
36	1.04114	251	40	25	0.0	0.20	0.5
37	1.04762	54	15	25	0.0	0.01	1.5
38	1.05755	153	25	25	0.0	0.01	1.5
39	1.07792	202	40	10	0.0	0.01	1.5
40	1.10392	104	25	10	0.0	0.01	1.5
41	1.10952	55	15	25	0.0	0.01	1.5
42	1.13128	6	15	10	0.0		

TABLE 4 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB2 WITHIN EACH GROUP 2

RHO=0.249

RANK	RB2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.97686	12	15	10	0.0	0.20	0.5
2	0.98714	8	15	10	0.0	0.01	0.5
3	0.98722	11	15	10	0.0	0.05	0.5
4	0.99032	9	15	10	0.4	0.01	0.5
5	0.99367	156	25	25	0.4	0.01	0.5
6	0.99451	257	40	25	0.0	0.20	0.5
7	0.99543	159	25	25	0.0	0.20	0.5
8	0.99545	205	40	10	0.4	0.01	0.5
9	0.99561	208	40	10	0.0	0.20	0.5
10	0.99567	106	25	10	0.0	0.01	0.5
11	0.99573	109	25	10	0.0	0.05	0.5
12	0.99617	206	40	10	0.8	0.01	0.5
13	0.99649	110	25	10	0.0	0.20	0.5
14	1.00000	10	15	10	0.8	0.01	0.5
15	1.00000	57	15	25	0.0	0.01	0.5
16	1.00000	58	15	25	0.4	0.01	0.5
17	1.00000	59	15	25	0.8	0.01	0.5
18	1.00000	61	15	25	0.0	0.20	0.5
19	1.00000	107	25	10	0.4	0.01	0.5
20	1.00000	108	25	10	0.8	0.01	0.5
21	1.00000	155	25	25	0.0	0.01	0.5
22	1.00000	157	25	25	0.8	0.01	0.5
23	1.00000	158	25	25	0.0	0.05	0.5
24	1.00000	204	40	10	0.0	0.01	0.5
25	1.00000	207	40	10	0.0	0.05	0.5
26	1.00000	253	40	25	0.0	0.01	0.5
27	1.00000	254	40	25	0.4	0.01	0.5
28	1.00000	255	40	25	0.8	0.01	0.5
29	1.00385	161	25	25	0.8	0.01	1.5
30	1.00472	60	15	25	0.0	0.05	0.5
31	1.00636	259	40	25	0.8	0.01	1.5
32	1.00855	256	40	25	0.0	0.05	0.5
33	1.01020	210	40	10	0.8	0.01	1.5
34	1.02251	63	15	25	0.8	0.01	1.5
35	1.02405	112	25	10	0.8	0.01	1.5
36	1.03614	258	40	25	0.0	0.01	1.5
37	1.04091	14	15	10	0.8	0.01	1.5
38	1.05386	160	25	25	0.0	0.01	1.5
39	1.06417	209	40	10	0.0	0.01	1.5
40	1.07084	62	15	25	0.0	0.01	1.5
41	1.07381	111	25	10	0.0	0.01	1.5
42	1.08654	13	15	10	0.0	0.01	1.5

TABLE 4 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB2 WITHIN EACH GROUP

RHO=0.5

RANK	RB2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.92000	68	15	25	0.0	0.20	0.5
2	0.92523	19	15	10	0.0	0.20	0.5
3	0.94822	117	25	10	0.0	0.20	0.5
4	0.95686	166	25	25	0.0	0.20	0.5
5	0.96011	15	15	10	0.0	0.01	0.5
6	0.96034	18	15	10	0.0	0.05	0.5
7	0.96073	16	15	10	0.4	0.01	0.5
8	0.96414	116	25	10	0.0	0.05	0.5
9	0.96429	67	15	25	0.0	0.05	0.5
10	0.96498	215	40	10	0.0	0.20	0.5
11	0.96714	64	15	25	0.0	0.01	0.5
12	0.96761	113	25	10	0.0	0.01	0.5
13	0.97073	65	15	25	0.4	0.01	0.5
14	0.97287	114	25	10	0.4	0.01	0.5
15	0.97927	211	40	10	0.0	0.01	0.5
16	0.97931	17	15	10	0.8	0.01	0.5
17	0.98000	214	40	10	0.0	0.05	0.5
18	0.98125	162	25	25	0.0	0.01	0.5
19	0.98193	165	25	25	0.0	0.05	0.5
20	0.98378	264	40	25	0.0	0.20	0.5
21	0.98844	163	25	25	0.4	0.01	0.5
22	0.98893	115	25	10	0.8	0.01	0.5
23	0.98958	66	15	25	0.8	0.01	0.5
24	0.99083	212	40	10	0.4	0.01	0.5
25	0.99174	260	40	25	0.0	0.01	0.5
26	0.99194	263	40	25	0.0	0.05	0.5
27	0.99291	261	40	25	0.4	0.01	0.5
28	0.99444	164	25	25	0.8	0.01	0.5
29	0.99624	213	40	10	0.8	0.01	0.5
30	1.00000	262	40	25	0.8	0.01	0.5
31	1.00556	168	25	25	0.8	0.01	1.5
32	1.00615	266	40	25	0.8	0.01	1.5
33	1.01474	119	25	10	0.8	0.01	1.5
34	1.01504	217	40	10	0.8	0.01	1.5
35	1.01913	70	15	25	0.8	0.01	1.5
36	1.02210	265	40	25	0.0	0.01	1.5
37	1.02708	167	25	25	0.0	0.01	1.5
38	1.02985	21	15	10	0.8	0.01	1.5
39	1.03599	69	15	25	0.0	0.01	1.5
40	1.05709	216	40	10	0.0	0.01	1.5
41	1.06065	118	25	10	0.0	0.01	1.5
42	1.07306	20	15	10	0.0	0.01	1.5

TABLE 4 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB2 WITHIN EACH GROUP

RHO=0.75

RANK	RB2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.81283	26	15	10	0.0	0.20	0.5
2	0.83117	75	15	25	0.0	0.20	0.5
3	0.83906	22	15	10	0.0	0.01	0.5
4	0.83940	25	15	10	0.0	0.05	0.5
5	0.85945	124	25	10	0.0	0.20	0.5
6	0.87025	23	15	10	0.4	0.01	0.5
7	0.88952	123	25	10	0.0	0.05	0.5
8	0.89017	120	25	10	0.0	0.01	0.5
9	0.89024	173	25	25	0.0	0.20	0.5
10	0.89145	74	15	25	0.0	0.05	0.5
11	0.89490	222	40	10	0.0	0.20	0.5
12	0.89865	71	15	25	0.0	0.01	0.5
13	0.90929	27	15	10	0.0	0.01	1.5
14	0.91437	121	25	10	0.4	0.01	0.5
15	0.91941	72	15	25	0.4	0.01	0.5
16	0.92490	218	40	10	0.0	0.01	0.5
17	0.92549	221	40	10	0.0	0.05	0.5
18	0.92885	271	40	25	0.0	0.20	0.5
19	0.93154	76	15	25	0.0	0.01	1.5
20	0.93623	125	25	10	0.0	0.01	1.5
21	0.93989	24	15	10	0.8	0.01	0.5
22	0.94064	172	25	25	0.0	0.05	0.5
23	0.94737	219	40	10	0.4	0.01	0.5
24	0.94787	169	25	25	0.0	0.01	0.5
25	0.96209	170	25	25	0.4	0.01	0.5
26	0.96795	267	40	25	0.0	0.01	0.5
27	0.96875	73	15	25	0.8	0.01	0.5
28	0.96918	122	25	10	0.8	0.01	0.5
29	0.95951	270	40	25	0.0	0.05	0.5
30	0.98104	174	25	25	0.0	0.01	1.5
31	0.98175	220	40	10	0.8	0.01	0.5
32	0.98235	268	40	25	0.4	0.01	0.5
33	0.98551	223	40	10	0.0	0.01	1.5
34	0.98636	28	15	10	0.8	0.01	1.5
35	0.98919	171	25	25	0.8	0.01	0.5
36	0.99422	269	40	25	0.8	0.01	0.5
37	1.00000	77	15	25	0.8	0.01	1.5
38	1.00114	126	25	10	0.8	0.01	1.5
39	1.00243	224	40	10	0.8	0.01	1.5
40	1.00360	175	25	25	0.8	0.01	1.5
41	1.00774	273	40	25	0.8	0.01	1.5
42	1.01502	272	40	25	0.0	0.01	1.5

TABLE 4 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB2 WITHIN EACH GROUP

RHO=0.9

RANK	RB2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.703206	33	15	10	0.0	0.20	0.5
2	0.724450	32	15	10	0.0	0.05	0.5
3	0.724967	29	15	10	0.0	0.01	0.5
4	0.728745	82	15	25	0.0	0.20	0.5
5	0.737834	131	25	10	0.0	0.20	0.5
6	0.745089	34	15	10	0.0	0.01	1.5
7	0.747851	30	15	10	0.4	0.01	0.5
8	0.777778	130	25	10	0.0	0.05	0.5
9	0.780632	127	25	10	0.0	0.01	0.5
10	0.790224	180	25	25	0.0	0.20	0.5
11	0.796407	229	40	10	0.0	0.20	0.5
12	0.797189	81	15	25	0.0	0.05	0.5
13	0.803419	78	15	25	0.0	0.01	0.5
14	0.814766	132	25	10	0.0	0.01	1.5
15	0.816034	83	15	25	0.0	0.01	1.5
16	0.822222	128	25	10	0.4	0.01	0.5
17	0.832891	278	40	25	0.0	0.20	0.5
18	0.833741	79	15	25	0.4	0.01	0.5
19	0.842752	228	40	10	0.0	0.05	0.5
20	0.844444	31	15	10	0.8	0.01	0.5
21	0.845000	225	40	10	0.0	0.01	0.5
22	0.864198	179	25	25	0.0	0.05	0.5
23	0.866307	35	15	10	0.8	0.01	1.5
24	0.871795	176	25	25	0.0	0.01	0.5
25	0.872576	226	40	10	0.4	0.01	0.5
26	0.882304	230	40	10	0.0	0.01	1.5
27	0.897527	177	25	25	0.4	0.01	0.5
28	0.911135	181	25	25	0.0	0.01	1.5
29	0.911290	277	40	25	0.0	0.05	0.5
30	0.915946	274	40	25	0.0	0.01	0.5
31	0.918919	80	15	25	0.8	0.01	0.5
32	0.919444	129	25	10	0.8	0.01	0.5
33	0.940678	275	40	25	0.4	0.01	0.5
34	0.940842	84	15	25	0.8	0.01	1.5
35	0.949206	227	40	10	0.8	0.01	0.5
36	0.949509	279	40	25	0.0	0.01	1.5
37	0.955432	133	25	10	0.8	0.01	1.5
38	0.959459	178	25	25	0.8	0.01	0.5
39	0.975369	276	40	25	0.8	0.01	0.5
40	0.977683	231	40	10	0.8	0.01	1.5
41	0.984917	182	25	25	0.8	0.01	1.5
42	0.993421	280	40	25	0.8	0.01	1.5

TABLE 4 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB2 WITHIN EACH GROUP

RHO=0.95

RANK	RB2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.647809	40	15	10	0.0	0.20	0.5
2	0.650215	89	15	25	0.0	0.20	0.5
3	0.664036	138	25	10	0.0	0.20	0.5
4	0.669831	36	15	10	0.0	0.01	0.5
5	0.671458	39	15	10	0.0	0.05	0.5
6	0.692145	41	15	10	0.0	0.01	1.5
7	0.694545	37	15	10	0.4	0.01	0.5
8	0.699713	137	25	10	0.0	0.05	0.5
9	0.701031	134	25	10	0.0	0.01	0.5
10	0.719033	236	40	10	0.0	0.20	0.5
11	0.719444	187	25	25	0.0	0.20	0.5
12	0.723561	139	25	10	0.0	0.01	1.5
13	0.736089	88	15	25	0.0	0.05	0.5
14	0.741085	135	25	10	0.4	0.01	0.5
15	0.742200	85	15	25	0.0	0.01	0.5
16	0.761194	235	40	10	0.0	0.05	0.5
17	0.761815	232	40	10	0.0	0.01	0.5
18	0.764599	285	40	25	0.0	0.20	0.5
19	0.769441	90	15	25	0.0	0.01	1.5
20	0.779152	38	15	10	0.8	0.01	0.5
21	0.780115	86	15	25	0.4	0.01	0.5
22	0.792411	186	25	25	0.0	0.05	0.5
23	0.795712	237	40	10	0.0	0.01	1.5
24	0.797619	183	25	25	0.0	0.01	0.5
25	0.804040	233	40	10	0.4	0.01	0.5
26	0.805556	42	15	10	0.8	0.01	1.5
27	0.825219	188	25	25	0.0	0.01	1.5
28	0.829333	184	25	25	0.4	0.01	0.5
29	0.844211	136	25	10	0.8	0.01	0.5
30	0.844575	284	40	25	0.0	0.05	0.5
31	0.852665	281	40	25	0.0	0.01	0.5
32	0.868680	140	25	10	0.8	0.01	1.5
33	0.875000	286	40	25	0.0	0.01	1.5
34	0.875000	87	15	25	0.8	0.01	0.5
35	0.882943	282	40	25	0.4	0.01	0.5
36	0.899365	91	15	25	0.8	0.01	1.5
37	0.902676	234	40	10	0.8	0.01	0.5
38	0.913681	238	40	10	0.8	0.01	1.5
39	0.917241	185	25	25	0.8	0.01	0.5
40	0.935035	189	25	25	0.8	0.01	1.5
41	0.953191	283	40	25	0.8	0.01	0.5
42	0.965763	287	40	25	0.8	0.01	1.5

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TABLE 4 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY RB2 WITHIN EACH GROUP

RHO=0.989

RANK	RB2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.580028	194	25	25	0.0	0.20	0.5
2	0.583564	46	15	10	0.0	0.05	0.5
3	0.583572	43	15	10	0.0	0.01	0.5
4	0.584824	48	15	10	0.0	0.01	1.5
5	0.587989	96	15	25	0.0	0.20	0.5
6	0.593891	145	25	10	0.0	0.20	0.5
7	0.594468	47	15	10	0.0	0.20	0.5
8	0.597211	92	15	25	0.0	0.01	0.5
9	0.599586	97	15	25	0.0	0.01	1.5
10	0.599705	95	15	25	0.0	0.05	0.5
11	0.613197	44	15	10	0.4	0.01	0.5
12	0.614110	144	25	10	0.0	0.05	0.5
13	0.616155	141	25	10	0.0	0.01	0.5
14	0.618729	146	25	10	0.0	0.01	1.5
15	0.621495	243	40	10	0.0	0.20	0.5
16	0.623529	242	40	10	0.0	0.05	0.5
17	0.623932	239	40	10	0.0	0.01	0.5
18	0.624608	244	40	10	0.0	0.01	1.5
19	0.629021	142	25	10	0.4	0.01	0.5
20	0.630149	93	15	25	0.4	0.01	0.5
21	0.636675	292	40	25	0.0	0.20	0.5
22	0.638754	240	40	10	0.4	0.01	0.5
23	0.640919	193	25	25	0.0	0.05	0.5
24	0.646368	190	25	25	0.0	0.01	0.5
25	0.652437	195	25	25	0.0	0.01	1.5
26	0.660071	49	15	10	0.8	0.01	1.5
27	0.666408	45	15	10	0.8	0.01	0.5
28	0.667491	191	25	25	0.4	0.01	0.5
29	0.671582	291	40	25	0.0	0.05	0.5
30	0.680641	293	40	25	0.0	0.01	1.5
31	0.682652	288	40	25	0.0	0.01	0.5
32	0.692632	143	25	10	0.9	0.01	0.5
33	0.692714	147	25	10	0.8	0.01	1.5
34	0.715984	94	15	25	0.8	0.01	0.5
35	0.720106	98	15	25	0.8	0.01	1.5
36	0.724638	289	40	25	0.4	0.01	0.5
37	0.734286	241	40	10	0.8	0.01	0.5
38	0.745827	245	40	10	0.8	0.01	1.5
39	0.783784	192	25	25	0.8	0.01	0.5
40	0.784680	196	25	25	0.8	0.01	1.5
41	0.827160	290	40	25	0.8	0.01	0.5
42	0.836364	294	40	25	0.8	0.01	1.5

TABLE 5. Results of 294 experiments grouped by ρ and ranked within each group by P_RGE1.

Explanation

Because this table was printed on a line printer without lower case or Greek letters, the following notation changes were made:

Text notation	Equivalent table notation
ρ	RHO
N	NB
n	NY
ρ_c	RHO_C
$\sigma(\zeta_j)$	SD_ZETA
β_2	BETA_2

In all experiments,

$$\sigma(\eta_j)=\sigma(\zeta_j)$$

$$\beta_o=0.$$

$$\beta_1=1.$$

TABLE 5 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE1 WITHIN EACH GROUP

RHO=0

RANK	P_RGE1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.428	4	15	10	0.0	0.05	0.5
2	0.430	101	25	10	0.8	0.01	0.5
3	0.434	103	25	10	0.0	0.20	0.5
4	0.434	197	40	10	0.0	0.01	0.5
5	0.442	1	15	10	0.0	0.01	0.5
6	0.442	148	25	25	0.0	0.01	0.5
7	0.442	200	40	10	0.0	0.05	0.5
8	0.442	250	40	25	0.0	0.20	0.5
9	0.444	2	15	10	0.4	0.01	0.5
10	0.448	54	15	25	0.0	0.20	0.5
11	0.448	151	25	25	0.0	0.05	0.5
12	0.454	3	15	10	0.8	0.01	0.5
13	0.454	198	40	10	0.4	0.01	0.5
14	0.454	247	40	25	0.4	0.01	0.5
15	0.456	249	40	25	0.0	0.05	0.5
16	0.458	5	15	10	0.0	0.20	0.5
17	0.458	201	40	10	0.0	0.20	0.5
18	0.460	246	40	25	0.0	0.01	0.5
19	0.460	248	40	25	0.8	0.01	0.5
20	0.462	100	25	10	0.4	0.01	0.5
21	0.468	149	25	25	0.4	0.01	0.5
22	0.468	199	40	10	0.8	0.01	0.5
23	0.470	152	25	25	0.0	0.20	0.5
24	0.472	99	25	10	0.0	0.01	0.5
25	0.482	50	15	25	0.0	0.01	0.5
26	0.482	102	25	10	0.0	0.05	0.5
27	0.482	105	25	10	0.8	0.01	1.5
28	0.482	252	40	25	0.8	0.01	1.5
29	0.492	150	25	25	0.8	0.01	0.5
30	0.494	52	15	25	0.8	0.01	0.5
31	0.496	51	15	25	0.4	0.01	0.5
32	0.496	53	15	25	0.0	0.05	0.5
33	0.498	203	40	10	0.8	0.01	1.5
34	0.510	202	40	10	0.0	0.01	1.5
35	0.518	251	40	25	0.0	0.01	1.5
36	0.522	7	15	10	0.8	0.01	1.5
37	0.526	154	25	25	0.8	0.01	1.5
38	0.535	153	25	25	0.0	0.01	1.5
39	0.574	56	15	25	0.8	0.01	1.5
40	0.600	104	25	10	0.0	0.01	1.5
41	0.610	55	15	25	0.0	0.01	1.5
42	0.612	6	15	10	0.0	0.01	1.5

TABLE 5 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE1 WITHIN EACH GROUP

RHO=0.249

RANK	P_RGE1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.450	207	40	10	0.0	0.05	0.5
2	0.460	208	40	10	0.0	0.20	0.5
3	0.468	205	40	10	0.4	0.01	0.5
4	0.470	254	40	25	0.4	0.01	0.5
5	0.470	255	40	25	0.8	0.01	0.5
6	0.470	256	40	25	0.0	0.05	0.5
7	0.472	204	40	10	0.0	0.01	0.5
8	0.476	206	40	10	0.8	0.01	0.5
9	0.478	106	25	10	0.0	0.01	0.5
10	0.480	253	40	25	0.0	0.01	0.5
11	0.482	58	15	25	0.4	0.01	0.5
12	0.482	107	25	10	0.4	0.01	0.5
13	0.482	109	25	10	0.0	0.05	0.5
14	0.486	59	15	25	0.8	0.01	0.5
15	0.486	108	25	10	0.8	0.01	0.5
16	0.488	57	15	25	0.0	0.01	0.5
17	0.490	110	25	10	0.0	0.20	0.5
18	0.494	257	40	25	0.0	0.20	0.5
19	0.496	157	25	25	0.8	0.01	0.5
20	0.496	158	25	25	0.0	0.05	0.5
21	0.500	12	15	10	0.0	0.20	0.5
22	0.500	155	25	25	0.0	0.01	0.5
23	0.502	9	15	10	0.4	0.01	0.5
24	0.504	60	15	25	0.0	0.05	0.5
25	0.508	159	25	25	0.0	0.20	0.5
26	0.510	156	25	25	0.4	0.01	0.5
27	0.512	11	15	10	0.0	0.05	0.5
28	0.520	8	15	10	0.0	0.01	0.5
29	0.524	61	15	25	0.0	0.20	0.5
30	0.530	10	15	10	0.8	0.01	0.5
31	0.578	63	15	25	0.8	0.01	1.5
32	0.626	259	40	25	0.8	0.01	1.5
33	0.650	161	25	25	0.8	0.01	1.5
34	0.656	112	25	10	0.8	0.01	1.5
35	0.660	210	40	10	0.8	0.01	1.5
36	0.676	14	15	10	0.8	0.01	1.5
37	0.682	62	15	25	0.0	0.01	1.5
38	0.692	160	25	25	0.0	0.01	1.5
39	0.704	258	40	25	0.0	0.01	1.5
40	0.734	111	25	10	0.0	0.01	1.5
41	0.746	13	15	10	0.0	0.01	1.5
42	0.748	209	40	10	0.0	0.01	1.5

TABLE 5 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE1 WITHIN EACH GROUP

RHO=0.5

RANK	P_RGE1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.466	260	40	25	0.0	0.01	0.5
2	0.472	263	40	25	0.0	0.05	0.5
3	0.476	261	40	25	0.4	0.01	0.5
4	0.482	262	40	25	0.8	0.01	0.5
5	0.498	115	25	10	0.8	0.01	0.5
6	0.498	264	40	25	0.0	0.20	0.5
7	0.504	213	40	10	0.8	0.01	0.5
8	0.514	162	25	25	0.0	0.01	0.5
9	0.514	212	40	10	0.4	0.01	0.5
10	0.516	114	25	10	0.4	0.01	0.5
11	0.516	163	25	25	0.4	0.01	0.5
12	0.518	66	15	25	0.8	0.01	0.5
13	0.524	165	25	25	0.0	0.05	0.5
14	0.530	164	25	25	0.8	0.01	0.5
15	0.546	17	15	10	0.8	0.01	0.5
16	0.556	65	15	25	0.4	0.01	0.5
17	0.556	113	25	10	0.0	0.01	0.5
18	0.556	116	25	10	0.0	0.05	0.5
19	0.560	67	15	25	0.0	0.05	0.5
20	0.560	214	40	10	0.0	0.05	0.5
21	0.566	211	40	10	0.0	0.01	0.5
22	0.566	215	40	10	0.0	0.20	0.5
23	0.570	16	15	10	0.4	0.01	0.5
24	0.570	64	15	25	0.0	0.01	0.5
25	0.572	166	25	25	0.0	0.20	0.5
26	0.576	18	15	10	0.0	0.05	0.5
27	0.584	15	15	10	0.0	0.01	0.5
28	0.586	117	25	10	0.0	0.20	0.5
29	0.588	19	15	10	0.0	0.20	0.5
30	0.588	266	40	25	0.8	0.01	1.5
31	0.602	168	25	25	0.8	0.01	1.5
32	0.616	68	15	25	0.0	0.20	0.5
33	0.668	217	40	10	0.8	0.01	1.5
34	0.668	265	40	25	0.0	0.01	1.5
35	0.680	70	15	25	0.8	0.01	1.5
36	0.692	21	15	10	0.8	0.01	1.5
37	0.696	167	25	25	0.0	0.01	1.5
38	0.702	119	25	10	0.8	0.01	1.5
39	0.742	216	40	10	0.0	0.01	1.5
40	0.762	69	15	25	0.0	0.01	1.5
41	0.786	118	25	10	0.0	0.01	1.5
42	0.790	20	15	10	0.0	0.01	1.5

TABLE 5 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE1 WITHIN EACH GROUP

RHO=0.75

RANK	P_RGE1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.492	175	25	25	0.8	0.01	1.5
2	0.502	273	40	25	0.8	0.01	1.5
3	0.542	272	40	25	0.0	0.01	1.5
4	0.548	224	40	10	0.8	0.01	1.5
5	0.550	174	25	25	0.0	0.01	1.5
6	0.576	77	15	25	0.8	0.01	1.5
7	0.592	269	40	25	0.8	0.01	0.5
8	0.612	126	25	10	0.8	0.01	1.5
9	0.630	270	40	25	0.0	0.05	0.5
10	0.650	223	40	10	0.0	0.01	1.5
11	0.652	267	40	25	0.0	0.01	0.5
12	0.652	268	40	25	0.4	0.01	0.5
13	0.654	220	40	10	0.8	0.01	0.5
14	0.664	122	25	10	0.8	0.01	0.5
15	0.666	73	15	25	0.8	0.01	0.5
16	0.666	171	25	25	0.8	0.01	0.5
17	0.672	28	15	10	0.8	0.01	1.5
18	0.678	76	15	25	0.0	0.01	1.5
19	0.694	170	25	25	0.4	0.01	0.5
20	0.702	125	25	10	0.0	0.01	1.5
21	0.722	24	15	10	0.8	0.01	0.5
22	0.722	221	40	10	0.0	0.05	0.5
23	0.726	219	40	10	0.4	0.01	0.5
24	0.730	72	15	25	0.4	0.01	0.5
25	0.732	169	25	25	0.0	0.01	0.5
26	0.736	23	15	10	0.4	0.01	0.5
27	0.736	218	40	10	0.0	0.01	0.5
28	0.738	172	25	25	0.0	0.05	0.5
29	0.740	25	15	10	0.0	0.05	0.5
30	0.746	271	40	25	0.0	0.20	0.5
31	0.754	22	15	10	0.0	0.01	0.5
32	0.756	121	25	10	0.4	0.01	0.5
33	0.762	27	15	10	0.0	0.01	1.5
34	0.762	173	25	25	0.0	0.20	0.5
35	0.766	222	40	10	0.0	0.20	0.5
36	0.770	71	15	25	0.0	0.01	0.5
37	0.770	120	25	10	0.0	0.01	0.5
38	0.770	123	25	10	0.0	0.05	0.5
39	0.774	26	15	10	0.0	0.20	0.5
40	0.774	74	15	25	0.0	0.05	0.5
41	0.784	124	25	10	0.0	0.20	0.5
42	0.788	75	15	25	0.0	0.20	0.5

TABLE 5 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE1 WITHIN EACH GROUP 5

RHO=0.9

RANK	P_RGE1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.470	280	40	25	0.8	0.01	1.5
2	0.496	182	25	25	0.8	0.01	1.5
3	0.538	279	40	25	0.0	0.01	1.5
4	0.570	231	40	10	0.8	0.01	1.5
5	0.602	84	15	25	0.8	0.01	1.5
6	0.606	133	25	10	0.8	0.01	1.5
7	0.606	181	25	25	0.0	0.01	1.5
8	0.692	83	15	25	0.0	0.01	1.5
9	0.696	35	15	10	0.8	0.01	1.5
10	0.712	230	40	10	0.0	0.01	1.5
11	0.748	132	25	10	0.0	0.01	1.5
12	0.776	276	40	25	0.8	0.01	0.5
13	0.782	129	25	10	0.8	0.01	0.5
14	0.806	178	25	25	0.8	0.01	0.5
15	0.806	227	40	10	0.8	0.01	0.5
16	0.814	34	15	10	0.0	0.01	1.5
17	0.816	80	15	25	0.8	0.01	0.5
18	0.844	179	25	25	0.0	0.05	0.5
19	0.854	176	25	25	0.0	0.01	0.5
20	0.858	31	15	10	0.8	0.01	0.5
21	0.860	131	25	10	0.0	0.20	0.5
22	0.860	180	25	25	0.0	0.20	0.5
23	0.864	79	15	25	0.4	0.01	0.5
24	0.864	128	25	10	0.4	0.01	0.5
25	0.864	275	40	25	0.4	0.01	0.5
26	0.872	78	15	25	0.0	0.01	0.5
27	0.872	177	25	25	0.4	0.01	0.5
28	0.876	127	25	10	0.0	0.01	0.5
29	0.876	274	40	25	0.0	0.01	0.5
30	0.880	226	40	10	0.4	0.01	0.5
31	0.882	225	40	10	0.0	0.01	0.5
32	0.884	277	40	25	0.0	0.05	0.5
33	0.888	81	15	25	0.0	0.05	0.5
34	0.888	82	15	25	0.0	0.20	0.5
35	0.890	30	15	10	0.4	0.01	0.5
36	0.894	278	40	25	0.0	0.20	0.5
37	0.896	228	40	10	0.0	0.05	0.5
38	0.896	229	40	10	0.0	0.20	0.5
39	0.898	33	15	10	0.0	0.20	0.5
40	0.902	29	15	10	0.0	0.01	0.5
41	0.902	130	25	10	0.0	0.05	0.5
42	0.914	32	15	10	0.0	0.05	0.5

TABLE 5 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE1 WITHIN EACH GROUP

RHO=0.95

RANK	P_RGE1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.508	287	40	25	0.8	0.01	1.5
2	0.550	189	25	25	0.8	0.01	1.5
3	0.616	286	40	25	0.0	0.01	1.5
4	0.636	91	15	25	0.8	0.01	1.5
5	0.642	238	40	10	0.8	0.01	1.5
6	0.664	188	25	25	0.0	0.01	1.5
7	0.666	140	25	10	0.8	0.01	1.5
8	0.680	237	40	10	0.0	0.01	1.5
9	0.698	90	15	25	0.0	0.01	1.5
10	0.704	42	15	10	0.8	0.01	1.5
11	0.756	139	25	10	0.0	0.01	1.5
12	0.820	41	15	10	0.0	0.01	0.5
13	0.854	234	40	10	0.8	0.01	0.5
14	0.864	136	25	10	0.8	0.01	0.5
15	0.864	283	40	25	0.8	0.01	0.5
16	0.866	38	15	10	0.8	0.01	0.5
17	0.868	185	25	25	0.8	0.01	0.5
18	0.896	87	15	25	0.8	0.01	0.5
19	0.900	89	15	25	0.0	0.20	0.5
20	0.902	282	40	25	0.4	0.01	0.5
21	0.904	233	40	10	0.4	0.01	0.5
22	0.910	40	15	10	0.0	0.20	0.5
23	0.910	86	15	25	0.4	0.01	0.5
24	0.912	85	15	25	0.0	0.01	0.5
25	0.912	88	15	25	0.0	0.05	0.5
26	0.912	135	25	10	0.4	0.01	0.5
27	0.912	184	25	25	0.4	0.01	0.5
28	0.914	36	15	10	0.0	0.01	0.5
29	0.914	37	15	10	0.4	0.01	0.5
30	0.916	187	25	25	0.0	0.20	0.5
31	0.918	137	25	10	0.0	0.05	0.5
32	0.920	39	15	10	0.0	0.05	0.5
33	0.920	281	40	25	0.0	0.01	0.5
34	0.922	134	25	10	0.0	0.01	0.5
35	0.922	183	25	25	0.0	0.01	0.5
36	0.922	232	40	10	0.0	0.01	0.5
37	0.924	235	40	10	0.0	0.05	0.5
38	0.924	284	40	25	0.0	0.05	0.5
39	0.924	285	40	25	0.0	0.20	0.5
40	0.926	186	25	25	0.0	0.05	0.5
41	0.932	138	25	10	0.0	0.20	0.5
42	0.932	236	40	10	0.0	0.20	0.5

TABLE 5 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE1 WITHIN EACH GROUP

RHO=0.989

RANK	P_RGE1	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.658	294	40	25	0.8	0.01	1.5
2	0.690	196	25	25	0.8	0.01	1.5
3	0.742	245	40	10	0.8	0.01	1.5
4	0.748	98	15	25	0.8	0.01	1.5
5	0.764	293	40	25	0.0	0.01	1.5
6	0.782	195	25	25	0.0	0.01	1.5
7	0.804	147	25	10	0.8	0.01	1.5
8	0.816	244	40	10	0.0	0.01	1.5
9	0.818	97	15	25	0.0	0.01	1.5
10	0.830	49	15	10	0.8	0.01	1.5
11	0.844	145	25	10	0.0	0.01	1.5
12	0.894	48	15	10	0.0	0.01	0.5
13	0.906	241	40	10	0.8	0.01	0.5
14	0.922	290	40	25	0.8	0.01	0.5
15	0.934	192	25	25	0.8	0.01	0.5
16	0.938	143	25	10	0.8	0.01	0.5
17	0.938	240	40	10	0.4	0.01	0.5
18	0.940	44	15	10	0.4	0.01	0.5
19	0.944	45	15	10	0.8	0.01	0.5
20	0.944	194	25	25	0.0	0.20	0.5
21	0.946	95	15	25	0.0	0.05	0.5
22	0.948	47	15	10	0.0	0.20	0.5
23	0.948	141	25	10	0.0	0.01	0.5
24	0.952	289	40	25	0.4	0.01	0.5
25	0.954	43	15	10	0.0	0.01	0.5
26	0.954	46	15	10	0.0	0.05	0.5
27	0.954	93	15	25	0.4	0.01	0.5
28	0.954	94	15	25	0.8	0.01	0.5
29	0.958	92	15	25	0.0	0.01	0.5
30	0.958	193	25	25	0.0	0.05	0.5
31	0.960	96	15	25	0.0	0.20	0.5
32	0.960	142	25	10	0.4	0.01	0.5
33	0.960	242	40	10	0.0	0.05	0.5
34	0.960	292	40	25	0.0	0.20	0.5
35	0.962	145	25	10	0.0	0.20	0.5
36	0.964	191	25	25	0.4	0.01	0.5
37	0.966	144	25	10	0.0	0.05	0.5
38	0.966	243	40	10	0.0	0.20	0.5
39	0.966	288	40	25	0.0	0.01	0.5
40	0.970	190	25	25	0.0	0.01	0.5
41	0.970	239	40	10	0.0	0.01	0.5
42	0.970	291	40	25	0.0	0.05	0.5

TABLE 6. Results of 294 experiments grouped by ρ and ranked within each group by P_RGEZ

Explanation

Because this table was printed on a line printer without lower case or Greek letters, necessitating the following notation changes were made:

Text notation	Equivalent table notation
ρ	RHO
N	NB
n	NY
ρ_c	RHO_C
$\sigma(\zeta_j)$	SD_ZETA
β_2	BETA_2

In all experiments,

$$\sigma(\eta_j)=\sigma(\zeta_j)$$

$$\beta_o=0.$$

$$\beta_1=1.$$

TABLE 6 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE2 WITHIN EACH GROUP 1

RHO=0

RANK	P_RGE2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.386	203	40	10	0.8	0.01	1.5
2	0.394	199	40	10	0.8	0.01	0.5
3	0.400	55	15	25	0.0	0.01	1.5
4	0.412	6	15	10	0.0	0.01	1.5
5	0.412	53	15	25	0.0	0.05	0.5
6	0.414	202	40	10	0.0	0.01	1.5
7	0.418	54	15	25	0.0	0.20	0.5
8	0.418	104	25	10	0.0	0.01	1.5
9	0.418	198	40	10	0.4	0.01	0.5
10	0.424	50	15	25	0.0	0.01	0.5
11	0.426	100	25	10	0.4	0.01	0.5
12	0.428	251	40	25	0.0	0.01	1.5
13	0.430	2	15	10	0.4	0.01	0.5
14	0.430	103	25	10	0.0	0.20	0.5
15	0.436	51	15	25	0.4	0.01	0.5
16	0.436	246	40	25	0.0	0.01	0.5
17	0.436	249	40	25	0.0	0.05	0.5
18	0.438	154	25	25	0.8	0.01	1.5
19	0.440	56	15	25	0.8	0.01	1.5
20	0.440	250	40	25	0.0	0.20	0.5
21	0.442	1	15	10	0.0	0.01	0.5
22	0.442	102	25	10	0.0	0.05	0.5
23	0.442	197	40	10	0.0	0.01	0.5
24	0.444	150	25	25	0.8	0.01	0.5
25	0.446	99	25	10	0.0	0.01	0.5
26	0.446	153	25	25	0.0	0.01	1.5
27	0.446	201	40	10	0.0	0.20	0.5
28	0.448	149	25	25	0.4	0.01	0.5
29	0.452	4	15	10	0.0	0.05	0.5
30	0.454	52	15	25	0.8	0.01	0.5
31	0.456	151	25	25	0.0	0.05	0.5
32	0.456	200	40	10	0.0	0.05	0.5
33	0.458	7	15	10	0.8	0.01	1.5
34	0.462	152	25	25	0.0	0.20	0.5
35	0.464	252	40	25	0.8	0.01	1.5
36	0.470	148	25	25	0.0	0.01	0.5
37	0.470	247	40	25	0.4	0.01	0.5
38	0.474	248	40	25	0.8	0.01	0.5
39	0.476	105	25	10	0.8	0.01	1.5
40	0.482	5	15	10	0.0	0.20	0.5
41	0.482	101	25	10	0.8	0.01	0.5
42	0.486	3	15	10	0.8	0.01	0.5

TABLE 6 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE2 WITHIN EACH GROUP

RHO=0.249

RANK	P_RGE2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.372	13	15	10	0.0	0.01	1.5
2	0.412	111	25	10	0.0	0.01	1.5
3	0.414	208	40	10	0.0	0.20	0.5
4	0.418	209	40	10	0.0	0.01	1.5
5	0.420	112	25	10	0.8	0.01	1.5
6	0.426	14	15	10	0.8	0.01	1.5
7	0.428	254	40	25	0.4	0.01	0.5
8	0.430	258	40	25	0.0	0.01	1.5
9	0.432	62	15	25	0.0	0.01	1.5
10	0.436	207	40	10	0.0	0.05	0.5
11	0.438	204	40	10	0.0	0.01	0.5
12	0.440	160	25	25	0.0	0.01	1.5
13	0.444	11	15	10	0.0	0.05	0.5
14	0.446	108	25	10	0.8	0.01	0.5
15	0.446	256	40	25	0.0	0.05	0.5
16	0.450	63	15	25	0.8	0.01	1.5
17	0.450	155	25	25	0.0	0.01	0.5
18	0.452	8	15	10	0.0	0.01	0.5
19	0.452	107	25	10	0.4	0.01	0.5
20	0.456	110	25	10	0.0	0.20	0.5
21	0.458	253	40	25	0.0	0.01	0.5
22	0.458	257	40	25	0.0	0.20	0.5
23	0.458	259	40	25	0.8	0.01	1.5
24	0.460	210	40	10	0.8	0.01	1.5
25	0.464	161	25	25	0.8	0.01	1.5
26	0.464	206	40	10	0.8	0.01	0.5
27	0.466	255	40	25	0.8	0.01	0.5
28	0.468	60	15	25	0.0	0.05	0.5
29	0.472	9	15	10	0.4	0.01	0.5
30	0.474	10	15	10	0.8	0.01	0.5
31	0.474	106	25	10	0.0	0.01	0.5
32	0.474	158	25	25	0.0	0.05	0.5
33	0.476	59	15	25	0.8	0.01	0.5
34	0.478	12	15	10	0.0	0.20	0.5
35	0.478	109	25	10	0.0	0.05	0.5
36	0.478	157	25	25	0.8	0.01	0.5
37	0.480	205	40	10	0.4	0.01	0.5
38	0.490	61	15	25	0.0	0.20	0.5
39	0.492	159	25	25	0.0	0.20	0.5
40	0.494	57	15	25	0.0	0.01	0.5
41	0.494	58	15	25	0.4	0.01	0.5
42	0.502	156	25	25	0.4	0.01	0.5

RHO=0.5

RANK	P_RGE2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.372	20	15	10	0.0	0.01	1.5
2	0.392	118	25	10	0.0	0.01	1.5
3	0.404	69	15	25	0.0	0.01	1.5
4	0.404	217	40	10	0.8	0.01	1.5
5	0.416	216	40	10	0.0	0.01	1.5
6	0.446	21	15	10	0.8	0.01	1.5
7	0.450	167	25	25	0.0	0.01	1.5
8	0.452	265	40	25	0.0	0.01	1.5
9	0.452	266	40	25	0.8	0.01	1.5
10	0.456	70	15	25	0.8	0.01	1.5
11	0.456	262	40	25	0.8	0.01	0.5
12	0.464	212	40	10	0.4	0.01	0.5
13	0.464	261	40	25	0.4	0.01	0.5
14	0.470	264	40	25	0.0	0.20	0.5
15	0.472	119	25	10	0.8	0.01	1.5
16	0.472	213	40	10	0.8	0.01	0.5
17	0.474	168	25	25	0.8	0.01	1.5
18	0.476	263	40	25	0.0	0.05	0.5
19	0.484	260	40	25	0.0	0.01	0.5
20	0.498	214	40	10	0.0	0.05	0.5
21	0.502	163	25	25	0.4	0.01	0.5
22	0.502	164	25	25	0.8	0.01	0.5
23	0.502	211	40	10	0.0	0.01	0.5
24	0.504	65	15	25	0.4	0.01	0.5
25	0.506	114	25	10	0.4	0.01	0.5
26	0.510	64	15	25	0.0	0.01	0.5
27	0.514	67	15	25	0.0	0.05	0.5
28	0.516	116	25	10	0.0	0.05	0.5
29	0.522	215	40	10	0.0	0.20	0.5
30	0.524	113	25	10	0.0	0.01	0.5
31	0.524	117	25	10	0.0	0.20	0.5
32	0.526	165	25	25	0.0	0.05	0.5
33	0.530	162	25	25	0.0	0.01	0.5
34	0.532	66	15	25	0.8	0.01	0.5
35	0.536	16	15	10	0.4	0.01	0.5
36	0.540	18	15	10	0.0	0.05	0.5
37	0.542	15	15	10	0.0	0.01	0.5
38	0.542	115	25	10	0.8	0.01	0.5
39	0.548	166	25	25	0.0	0.20	0.5
40	0.560	68	15	25	0.0	0.20	0.5
41	0.566	17	15	10	0.8	0.01	0.5
42	0.578	19	15	10	0.0	0.20	0.5

TABLE 6 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE2 WITHIN EACH GROUP

RHO=0.75

RANK	P_RGE2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.390	272	40	25	0.0	0.01	1.5
2	0.418	223	40	10	0.0	0.01	1.5
3	0.434	77	15	25	0.8	0.01	1.5
4	0.444	273	40	25	0.8	0.01	1.5
5	0.448	175	25	25	0.8	0.01	1.5
6	0.450	174	25	25	0.0	0.01	1.5
7	0.452	126	25	10	0.8	0.01	1.5
8	0.458	224	40	10	0.8	0.01	1.5
9	0.466	28	15	10	0.8	0.01	1.5
10	0.485	125	25	10	0.0	0.01	1.5
11	0.496	76	15	25	0.0	0.01	1.5
12	0.514	27	15	10	0.0	0.01	1.5
13	0.572	267	40	25	0.0	0.01	0.5
14	0.582	171	25	25	0.8	0.01	0.5
15	0.586	269	40	25	0.8	0.01	0.5
16	0.608	270	40	25	0.0	0.05	0.5
17	0.622	268	40	25	0.4	0.01	0.5
18	0.628	170	25	25	0.4	0.01	0.5
19	0.646	73	15	25	0.8	0.01	0.5
20	0.658	169	25	25	0.0	0.01	0.5
21	0.666	172	25	25	0.0	0.05	0.5
22	0.678	122	25	10	0.8	0.01	0.5
23	0.686	218	40	10	0.0	0.01	0.5
24	0.696	220	40	10	0.8	0.01	0.5
25	0.696	221	40	10	0.0	0.05	0.5
26	0.696	271	40	25	0.0	0.20	0.5
27	0.700	219	40	10	0.4	0.01	0.5
28	0.706	72	15	25	0.4	0.01	0.5
29	0.724	24	15	10	0.8	0.01	0.5
30	0.730	173	25	25	0.0	0.20	0.5
31	0.732	121	25	10	0.4	0.01	0.5
32	0.734	120	25	10	0.0	0.01	0.5
33	0.734	123	25	10	0.0	0.05	0.5
34	0.738	124	25	10	0.0	0.20	0.5
35	0.740	71	15	25	0.0	0.01	0.5
36	0.740	222	40	10	0.0	0.20	0.5
37	0.748	22	15	10	0.0	0.01	0.5
38	0.748	25	15	10	0.0	0.05	0.5
39	0.754	23	15	10	0.4	0.01	0.5
40	0.754	26	15	10	0.0	0.20	0.5
41	0.754	74	15	25	0.0	0.05	0.5
42	0.798	75	15	25	0.0	0.20	0.5

TABLE 6 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE2 WITHIN EACH GROUP

RHO=0.9

RANK	P_RGE2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.454	182	25	25	0.8	0.01	1.5
2	0.464	279	40	25	0.0	0.01	1.5
3	0.482	280	40	25	0.8	0.01	1.5
4	0.488	231	40	10	0.8	0.01	1.5
5	0.490	133	25	10	0.8	0.01	1.5
6	0.492	181	25	25	0.0	0.01	1.5
7	0.524	84	15	25	0.8	0.01	1.5
8	0.558	230	40	10	0.0	0.01	1.5
9	0.592	35	15	10	0.8	0.01	1.5
10	0.602	83	15	25	0.0	0.01	1.5
11	0.610	132	25	10	0.0	0.01	1.5
12	0.662	34	15	10	0.0	0.01	1.5
13	0.786	178	25	25	0.8	0.01	0.5
14	0.810	177	25	25	0.4	0.01	0.5
15	0.816	80	15	25	0.8	0.01	0.5
16	0.816	276	40	25	0.8	0.01	0.5
17	0.822	179	25	25	0.0	0.05	0.5
18	0.828	129	25	10	0.8	0.01	0.5
19	0.838	227	40	10	0.8	0.01	0.5
20	0.840	176	25	25	0.0	0.01	0.5
21	0.846	128	25	10	0.4	0.01	0.5
22	0.846	274	40	25	0.0	0.01	0.5
23	0.852	275	40	25	0.4	0.01	0.5
24	0.856	31	15	10	0.8	0.01	0.5
25	0.856	79	15	25	0.4	0.01	0.5
26	0.858	225	40	10	0.0	0.01	0.5
27	0.860	131	25	10	0.0	0.20	0.5
28	0.860	226	40	10	0.4	0.01	0.5
29	0.862	180	25	25	0.0	0.20	0.5
30	0.868	78	15	25	0.0	0.01	0.5
31	0.870	229	40	10	0.0	0.20	0.5
32	0.872	29	15	10	0.0	0.01	0.5
33	0.872	228	40	10	0.0	0.05	0.5
34	0.874	127	25	10	0.0	0.01	0.5
35	0.882	82	15	25	0.0	0.20	0.5
36	0.882	277	40	25	0.0	0.05	0.5
37	0.886	32	15	10	0.0	0.05	0.5
38	0.886	33	15	10	0.0	0.20	0.5
39	0.888	30	15	10	0.4	0.01	0.5
40	0.892	81	15	25	0.0	0.05	0.5
41	0.892	130	25	10	0.0	0.05	0.5
42	0.904	278	40	25	0.0	0.20	0.5

TABLE 6 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE2 WITHIN EACH GROUP

RHO=0.95

RANK	P_PGE2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.482	287	40	25	0.8	0.01	1.5
2	0.514	286	40	25	0.0	0.01	1.5
3	0.530	189	25	25	0.8	0.01	1.5
4	0.534	91	15	25	0.8	0.01	1.5
5	0.566	238	40	10	0.8	0.01	1.5
6	C.590	237	40	10	0.0	0.01	1.5
7	0.606	140	25	10	0.8	0.01	1.5
8	0.612	188	25	25	0.0	0.01	1.5
9	0.630	90	15	25	0.0	0.01	1.5
10	0.636	42	15	10	0.8	0.01	1.5
11	0.650	139	25	10	0.0	0.01	1.5
12	0.720	41	15	10	0.0	0.01	1.5
13	0.866	283	40	25	0.8	0.01	0.5
14	0.874	282	40	25	0.4	0.01	0.5
15	0.876	185	25	25	0.8	0.01	0.5
16	0.878	234	40	10	0.8	0.01	0.5
17	0.888	135	25	10	0.4	0.01	0.5
18	0.890	38	15	10	0.8	0.01	0.5
19	0.890	86	15	25	0.4	0.01	0.5
20	0.890	136	25	10	0.8	0.01	0.5
21	0.890	187	25	25	0.0	0.20	0.5
22	0.892	87	15	25	0.8	0.01	0.5
23	0.896	40	15	10	0.0	0.20	0.5
24	0.902	236	40	10	0.0	0.20	0.5
25	0.906	37	15	10	0.4	0.01	0.5
26	0.908	39	15	10	0.0	0.05	0.5
27	0.908	134	25	10	0.0	0.01	0.5
28	0.908	184	25	25	0.4	0.01	0.5
29	0.908	235	40	10	0.0	0.05	0.5
30	0.912	89	15	25	0.0	0.20	0.5
31	0.912	281	40	25	0.0	0.01	0.5
32	0.914	88	15	25	0.0	0.05	0.5
33	0.914	186	25	25	0.0	0.05	0.5
34	0.914	232	40	10	0.0	0.01	0.5
35	0.914	233	40	10	0.4	0.01	0.5
36	0.914	284	40	25	0.0	0.05	0.5
37	0.916	85	15	25	0.0	0.01	0.5
38	0.916	183	25	25	0.0	0.01	0.5
39	0.920	36	15	10	0.0	0.01	0.5
40	0.922	137	25	10	0.0	0.05	0.5
41	0.926	138	25	10	0.0	0.20	0.5
42	0.932	285	40	25	0.0	0.20	0.5

TABLE 6 CONTINUED. -- RESULTS OF 294 EXPERIMENTS GROUPED BY RHO AND RANKED BY P_RGE2 WITHIN EACH GROUP

RHO=0.989

RANK	P_RGE2	EXP_NO	NB	NY	RHO_C	SD_ZETA	BETA_2
1	0.628	294	40	25	0.8	0.01	1.5
2	0.676	195	25	25	0.8	0.01	1.5
3	0.704	245	40	10	0.8	0.01	1.5
4	0.712	98	15	25	0.8	0.01	1.5
5	0.740	195	25	25	0.0	0.01	1.5
6	0.740	293	40	25	0.0	0.01	1.5
7	0.766	147	25	10	0.8	0.01	1.5
8	0.782	244	40	10	0.0	0.01	1.5
9	0.786	97	15	25	0.0	0.01	1.5
10	0.824	49	15	10	0.8	0.01	1.5
11	0.842	146	25	10	0.0	0.01	1.5
12	0.874	48	15	10	0.0	0.01	1.5
13	0.914	290	40	25	0.8	0.01	0.5
14	0.918	94	15	25	0.8	0.01	0.5
15	0.924	241	40	10	0.8	0.01	0.5
16	0.934	143	25	10	0.8	0.01	0.5
17	0.936	292	40	25	0.0	0.20	0.5
18	0.938	142	25	10	0.4	0.01	0.5
19	0.940	192	25	25	0.8	0.01	0.5
20	0.944	44	15	10	0.4	0.01	0.5
21	0.946	45	15	10	0.8	0.01	0.5
22	0.948	190	25	25	0.0	0.01	0.5
23	0.950	96	15	25	0.0	0.20	0.5
24	0.950	193	25	25	0.0	0.05	0.5
25	0.952	95	15	25	0.0	0.05	0.5
26	0.952	240	40	10	0.4	0.01	0.5
27	0.954	46	15	10	0.0	0.05	0.5
28	0.954	92	15	25	0.0	0.01	0.5
29	0.954	93	15	25	0.4	0.01	0.5
30	0.956	194	25	25	0.0	0.20	0.5
31	0.956	239	40	10	0.0	0.01	0.5
32	0.956	242	40	10	0.0	0.05	0.5
33	0.960	43	15	10	0.0	0.01	0.5
34	0.960	141	25	10	0.0	0.01	0.5
35	0.962	243	40	10	0.0	0.20	0.5
36	0.962	289	40	25	0.4	0.01	0.5
37	0.962	291	40	25	0.0	0.05	0.5
38	0.956	145	25	10	0.0	0.20	0.5
39	0.968	47	15	10	0.0	0.20	0.5
40	0.968	298	40	25	0.0	0.01	0.5
41	0.970	144	25	10	0.0	0.05	0.5
42	0.970	191	25	25	0.4	0.01	0.5

APPENDIX A -- SIMULATION RESULTS.

Table 1A.--Summary of simulation results.

Explanation

Because this table was printed on a line printer without lower case or Greek letters, the following notation changes were made:

Text notation	Equivalent table notation
ρ	*RHO*
N	*NB*
n	*NY*
ρ_c	*RHO_C*
$\sigma(\zeta_j)$	*SD_ZETA*
β_2	*BETA_2*

In all experiments,

$$\sigma(\eta_j) = \sigma(\zeta_j)$$

$$\beta_0 = 0$$

$$\beta_1 = 1.$$

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=15 NY=10 RHO=0

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
1	0.5	0.01	0.0	1	0.269	0.275	0.573	0.576	0.131	0.135	0.133	0.135	-0.013	-0.009	-0.083	-0.082
2	0.5	0.01	0.4	1	0.328	0.333	0.509	0.512	0.171	0.172	0.122	0.123	-0.010	-0.003	-0.066	-0.062
3	0.5	0.01	0.8	1	0.412	0.414	0.332	0.333	0.272	0.271	0.080	0.080	-0.004	-0.001	-0.030	-0.026
4	0.5	0.05	0.0	1	0.301	0.307	0.585	0.589	0.125	0.127	0.136	0.138	-0.014	-0.003	-0.087	-0.079
5	0.5	0.20	0.0	1	0.586	0.589	0.738	0.744	0.110	0.106	0.166	0.160	-0.020	0.017	-0.120	-0.096
6	1.5	0.01	0.0	1	0.803	0.820	1.717	1.733	0.394	0.392	0.397	0.405	-0.038	-0.029	-0.148	-0.379
7	1.5	0.01	0.8	1	1.232	1.240	0.993	0.997	0.817	0.810	0.239	0.242	-0.011	-0.005	-0.059	-0.142

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
1	0.305	0.293	0.313	0.304	0.269	0.275	0.131	0.135	0.442	0.442	-0.001	0.271	0.0842	1.0000	0.0079
2	0.266	0.271	0.273	0.278	0.328	0.333	0.171	0.172	0.444	0.430	-0.001	0.271	0.0631	0.5519	0.0084
3	0.163	0.275	0.167	0.275	0.412	0.414	0.272	0.271	0.454	0.486	-0.001	0.271	0.0257	0.1071	0.0039
4	0.311	0.301	0.319	0.310	0.301	0.307	0.125	0.127	0.428	0.452	-0.001	0.271	0.0871	1.0000	0.0081
5	0.389	0.383	0.398	0.385	0.586	0.589	0.110	0.106	0.458	0.482	-0.001	0.271	0.1406	1.0000	0.0152
6	0.915	0.876	0.838	0.991	0.803	0.820	0.394	0.392	0.612	0.412	-0.001	0.271	0.1563	1.0000	0.0139
7	0.487	0.823	0.477	0.854	1.232	1.240	0.817	0.819	0.522	0.458	-0.001	0.271	0.0517	0.5865	0.0053

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS 2

NB=15 NY=10 RHO=0.249

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
8	0.5	0.01	0.0	1.0661	0.273	0.274	0.568	0.571	0.130	0.127	0.128	0.130	0.000	-0.018	-0.058	-0.076
9	0.5	0.01	0.4	1.0661	0.348	0.348	0.505	0.507	0.191	0.192	0.116	0.117	-0.005	-0.014	-0.051	-0.061
10	0.5	0.01	0.8	1.0661	0.427	0.427	0.329	0.329	0.294	0.294	0.076	0.076	-0.003	-0.025	-0.024	-0.046
11	0.5	0.05	0.0	1.0661	0.303	0.304	0.579	0.582	0.120	0.117	0.130	0.132	0.004	-0.023	-0.056	-0.082
12	0.5	0.20	0.0	1.0661	0.583	0.583	0.729	0.735	0.108	0.100	0.161	0.163	0.019	-0.041	-0.071	-0.127
13	1.5	0.01	0.0	1.0661	0.816	0.828	1.701	1.716	0.391	0.381	0.385	0.392	-0.003	-0.053	-0.058	-0.388
14	1.5	0.01	0.8	1.0661	1.276	1.281	0.983	0.987	0.882	0.885	0.227	0.230	-0.009	-0.074	-0.030	-0.211

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
8	0.311	0.311	0.301	0.307	0.279	0.276	0.134	0.127	0.520	0.452	-0.014	0.26	0.0769	0.3054	0.0103
9	0.270	0.310	0.264	0.307	0.352	0.350	0.192	0.192	0.502	0.472	-0.014	0.26	0.0615	0.3582	0.0102
10	0.166	0.293	0.164	0.293	0.429	0.428	0.293	0.293	0.530	0.474	-0.014	0.26	0.0264	0.1537	0.0037
11	0.315	0.313	0.303	0.309	0.308	0.306	0.125	0.117	0.512	0.444	-0.014	0.26	0.0798	0.3101	0.0114
12	0.385	0.389	0.366	0.380	0.588	0.584	0.116	0.103	0.500	0.478	-0.014	0.26	0.1272	0.5415	0.0122
13	0.933	0.936	0.827	1.017	0.832	0.835	0.403	0.380	0.746	0.372	-0.014	0.26	0.1506	1.0000	0.0138
14	0.498	0.880	0.468	0.916	1.283	1.285	0.831	0.882	0.676	0.426	-0.014	0.26	0.0555	0.5914	0.0062

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=15 NY=10 RHO=0.5

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_R2R
15	0.5	0.01	0.0	1.33333	0.276	0.278	0.565	0.568	0.132	0.134	0.130	0.132	0.002	-0.072	-0.048	-0.117
16	0.5	0.01	0.4	1.33333	0.342	0.343	0.497	0.499	0.179	0.180	0.120	0.121	-0.001	-0.052	-0.039	-0.088
17	0.5	0.01	0.8	1.33333	0.417	0.417	0.321	0.322	0.273	0.273	0.079	0.079	-0.003	-0.034	-0.020	-0.050
18	0.5	0.05	0.0	1.33333	0.307	0.309	0.576	0.579	0.122	0.123	0.132	0.134	0.003	-0.071	-0.049	-0.117
19	0.5	0.20	0.0	1.33333	0.586	0.586	0.726	0.731	0.101	0.099	0.163	0.166	0.008	-0.069	-0.069	-0.137
20	1.5	0.01	0.0	1.33333	0.825	0.842	1.693	1.708	0.399	0.405	0.390	0.398	0.006	-0.216	0.020	-0.558
21	1.5	0.01	0.8	1.33333	1.247	1.250	0.962	0.966	0.821	0.825	0.237	0.240	-0.011	-0.102	0.010	-0.242

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
15	0.344	0.351	0.323	0.337	0.300	0.291	0.155	0.144	0.584	0.542	-0.013	0.212	0.0813	0.5928	0.0091
16	0.317	0.331	0.301	0.318	0.361	0.354	0.185	0.181	0.570	0.536	-0.013	0.212	0.0621	0.4556	0.0073
17	0.199	0.290	0.195	0.284	0.425	0.423	0.270	0.270	0.546	0.566	-0.013	0.212	0.0256	0.1388	0.0033
18	0.350	0.353	0.327	0.339	0.329	0.321	0.144	0.133	0.576	0.540	-0.013	0.212	0.0843	0.5769	0.0084
19	0.433	0.428	0.392	0.396	0.606	0.593	0.123	0.108	0.588	0.578	-0.013	0.212	0.1336	0.9405	0.0110
20	1.032	1.054	0.882	1.131	0.896	0.887	0.466	0.435	0.790	0.372	-0.013	0.212	0.1615	1.0000	0.0111
21	0.598	0.871	0.557	0.897	1.273	1.269	0.813	0.816	0.692	0.446	-0.013	0.212	0.0518	0.5894	0.0043

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS 4

NB=15 NY=10 RHO=0.75

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
22	0.5	0.01	0.0	2.28571	0.279	0.269	0.575	0.577	0.134	0.131	0.136	0.137	-0.005	-0.049	-0.045	-0.083
23	0.5	0.01	0.4	2.28571	0.358	0.351	0.508	0.510	0.179	0.179	0.127	0.128	-0.003	-0.065	-0.037	-0.092
24	0.5	0.01	0.8	2.28571	0.445	0.442	0.327	0.327	0.279	0.279	0.076	0.078	-0.001	-0.060	-0.017	-0.070
25	0.5	0.05	0.0	2.28571	0.309	0.300	0.586	0.589	0.125	0.122	0.138	0.140	-0.006	-0.053	-0.048	-0.088
26	0.5	0.20	0.0	2.28571	0.584	0.578	0.733	0.738	0.100	0.099	0.168	0.170	-0.011	-0.068	-0.071	-0.123
27	1.5	0.01	0.0	2.28571	0.834	0.811	1.722	1.738	0.405	0.389	0.407	0.414	-0.014	-0.147	0.108	-0.530
28	1.5	0.01	0.8	2.28571	1.331	1.330	0.979	0.984	0.843	0.841	0.234	0.236	-0.002	-0.179	0.076	-0.361

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
22	0.462	0.466	0.385	0.391	0.360	0.317	0.211	0.171	0.754	0.748	-0.009	0.131	0.0742	0.3704	0.0100
23	0.392	0.447	0.334	0.389	0.422	0.392	0.208	0.190	0.736	0.754	-0.009	0.131	0.0596	0.2756	0.0052
24	0.250	0.366	0.228	0.344	0.476	0.467	0.274	0.273	0.722	0.724	-0.009	0.131	0.0254	0.1137	0.0031
25	0.466	0.467	0.387	0.392	0.386	0.344	0.200	0.160	0.740	0.748	-0.009	0.131	0.0780	0.3945	0.0103
26	0.561	0.561	0.446	0.456	0.658	0.609	0.178	0.132	0.774	0.754	-0.009	0.131	0.1246	0.9767	0.0152
27	1.389	1.400	1.074	1.273	1.077	0.968	0.636	0.496	0.762	0.514	-0.009	0.131	0.1452	1.0000	0.0110
28	0.749	1.100	0.647	1.085	1.427	1.405	0.824	0.822	0.672	0.466	-0.009	0.131	0.0540	0.3496	0.0040

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS 5

NB=15 NY=10 RHO=0.9

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
29	0.5	0.01	0.0	5.26316	0.282	0.253	0.583	0.587	0.139	0.130	0.142	0.144	0.061	-0.060	0.014	-0.074
30	0.5	0.01	0.4	5.26316	0.358	0.338	0.515	0.517	0.187	0.187	0.123	0.124	0.063	-0.061	0.021	-0.069
31	0.5	0.01	0.8	5.26316	0.434	0.428	0.334	0.335	0.294	0.295	0.081	0.081	0.037	-0.042	0.017	-0.046
32	0.5	0.05	0.0	5.26316	0.312	0.285	0.592	0.596	0.130	0.118	0.144	0.146	0.063	-0.061	0.013	-0.074
33	0.5	0.20	0.0	5.26316	0.587	0.563	0.732	0.738	0.112	0.095	0.172	0.174	0.069	-0.067	0.005	-0.090
34	1.5	0.01	0.0	5.26316	0.843	0.760	1.750	1.768	0.418	0.387	0.426	0.433	0.183	-0.179	0.351	-0.563
35	1.5	0.01	0.8	5.26316	1.301	1.284	1.001	1.007	0.882	0.889	0.242	0.245	0.109	-0.125	0.253	-0.362

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
29	0.747	0.749	0.536	0.543	0.523	0.391	0.362	0.267	0.902	0.872	-0.007	0.0584	0.0629	0.3297	0.0049
30	0.680	0.698	0.499	0.522	0.558	0.455	0.327	0.258	0.890	0.888	-0.007	0.0584	0.0500	0.2873	0.0049
31	0.425	0.495	0.348	0.418	0.534	0.498	0.301	0.290	0.858	0.856	-0.007	0.0584	0.0238	0.1047	0.0023
32	0.768	0.773	0.550	0.560	0.552	0.420	0.368	0.267	0.914	0.886	-0.007	0.0584	0.0640	0.3389	0.0040
33	0.956	0.967	0.674	0.680	0.836	0.686	0.415	0.294	0.898	0.886	-0.007	0.0584	0.0919	0.5071	0.0030
34	2.235	2.240	1.546	1.669	1.564	1.193	1.084	0.755	0.814	0.662	-0.007	0.0584	0.1181	0.8641	0.0048
35	1.275	1.481	1.019	1.283	1.599	1.501	0.935	0.861	0.696	0.592	-0.007	0.0584	0.0488	0.5712	0.0038

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS 6

NB=15 NY=10 RHO=0.95

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
36	0.5	0.01	0.0	10.2564	0.271	0.245	0.576	0.581	0.140	0.131	0.139	0.141	-0.094	0.051	-0.099	0.002
37	0.5	0.01	0.4	10.2564	0.346	0.329	0.510	0.513	0.183	0.187	0.121	0.122	-0.084	0.037	-0.082	-0.011
38	0.5	0.01	0.8	10.2564	0.449	0.443	0.327	0.329	0.286	0.289	0.080	0.080	-0.061	0.019	-0.061	-0.003
39	0.5	0.05	0.0	10.2564	0.303	0.279	0.585	0.589	0.132	0.121	0.142	0.144	-0.103	0.062	-0.105	0.007
40	0.5	0.20	0.0	10.2564	0.586	0.564	0.726	0.733	0.109	0.094	0.171	0.173	-0.141	0.101	-0.125	0.008
41	1.5	0.01	0.0	10.2564	0.808	0.734	1.729	1.747	0.419	0.393	0.418	0.423	-0.276	0.148	0.109	-0.425
42	1.5	0.01	0.8	10.2564	1.342	1.328	0.980	0.987	0.861	0.868	0.240	0.242	-0.179	0.051	0.133	-0.341

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
36	0.968	0.948	0.655	0.635	0.640	0.426	0.485	0.358	0.914	0.920	-0.007	0.037	0.0596	0.3147	0.0038
37	0.831	0.825	0.574	0.573	0.626	0.469	0.408	0.315	0.914	0.906	-0.007	0.037	0.0508	0.8527	0.0037
38	0.522	0.566	0.394	0.441	0.583	0.522	0.320	0.297	0.866	0.890	-0.007	0.037	0.0234	0.1577	0.0026
39	0.995	0.974	0.675	0.654	0.670	0.457	0.493	0.361	0.920	0.908	-0.007	0.037	0.0612	0.3171	0.0036
40	1.269	1.255	0.826	0.813	1.002	0.746	0.561	0.382	0.910	0.896	-0.007	0.037	0.0860	0.6342	0.0027
41	2.896	2.839	1.913	1.965	1.916	1.331	1.451	1.007	0.820	0.720	-0.007	0.037	0.1114	1.0000	0.0034
42	1.559	1.692	1.136	1.363	1.745	1.578	0.959	0.869	0.704	0.636	-0.007	0.037	0.0464	0.7766	0.0029

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=15 NY=10 RHO=0.989

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
43	0.5	0.01	0.0	45.7059	0.281	0.242	0.575	0.581	0.133	0.128	0.139	0.140	-0.155	0.116	-0.079	0.010
44	0.5	0.01	0.4	45.7059	0.350	0.325	0.506	0.511	0.180	0.182	0.121	0.122	-0.084	0.066	-0.036	-0.010
45	0.5	0.01	0.8	45.7059	0.445	0.433	0.325	0.327	0.288	0.292	0.073	0.077	-0.039	0.032	-0.007	-0.015
46	0.5	0.05	0.0	45.7059	0.313	0.277	0.585	0.592	0.124	0.116	0.141	0.142	-0.160	0.123	-0.071	0.003
47	0.5	0.20	0.0	45.7059	0.593	0.562	0.725	0.734	0.107	0.090	0.172	0.174	-0.179	0.148	-0.071	0.000
48	1.5	0.01	0.0	45.7059	0.839	0.722	1.724	1.745	0.400	0.384	0.416	0.421	-0.463	0.343	0.187	-0.396
49	1.5	0.01	0.8	45.7059	1.331	1.296	0.972	0.982	0.866	0.878	0.227	0.230	-0.116	0.094	0.368	-0.436

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
43	2.113	2.094	1.243	1.222	1.390	0.715	1.026	0.731	0.954	0.960	-0.001	0.0075	0.0345	0.3322	0.0008
44	1.840	1.864	1.121	1.143	1.258	0.721	0.899	0.661	0.940	0.944	-0.001	0.0075	0.0314	0.4196	0.0006
45	1.252	1.289	0.819	0.859	0.982	0.694	0.596	0.478	0.944	0.946	-0.001	0.0075	0.0155	0.1022	0.0005
46	2.183	2.166	1.282	1.264	1.443	0.758	1.057	0.743	0.954	0.954	-0.001	0.0075	0.0356	0.4228	0.0008
47	2.795	2.784	1.668	1.655	1.906	1.095	1.349	0.949	0.948	0.968	-0.001	0.0075	0.0459	0.5225	0.0007
48	6.318	6.260	3.687	3.661	4.156	2.201	3.069	2.109	0.894	0.874	-0.001	0.0075	0.0553	0.6031	0.0008
49	3.750	3.862	2.409	2.549	2.940	2.086	1.787	1.382	0.830	0.824	-0.001	0.0075	0.0260	0.2226	0.0006

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS 8

NB=15 NY=25 RHO=0

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
50	0.5	0.01	0.0	1	0.166	0.169	0.358	0.359	0.081	0.082	0.084	0.084	0.007	-0.020	-0.024	-0.051
51	0.5	0.01	0.4	1	0.220	0.221	0.310	0.311	0.111	0.112	0.076	0.076	0.004	-0.024	-0.019	-0.047
52	0.5	0.01	0.8	1	0.279	0.280	0.200	0.200	0.175	0.174	0.050	0.050	0.003	-0.021	-0.007	-0.030
53	0.5	0.05	0.0	1	0.212	0.214	0.375	0.376	0.070	0.071	0.086	0.087	0.003	-0.022	-0.030	-0.056
54	0.5	0.20	0.0	1	0.538	0.543	0.573	0.577	0.066	0.069	0.123	0.125	-0.009	-0.028	-0.082	-0.101
55	1.5	0.01	0.0	1	0.493	0.505	1.072	1.077	0.245	0.253	0.249	0.252	0.021	-0.061	-0.033	-0.220
56	1.5	0.01	0.8	1	0.833	0.836	0.597	0.598	0.527	0.526	0.149	0.150	0.011	-0.061	-0.007	-0.114

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
50	0.185	0.186	0.185	0.192	0.166	0.169	0.081	0.082	0.482	0.424	0.011	0.27	0.0305	0.1755	0.0045
51	0.165	0.186	0.166	0.191	0.220	0.221	0.111	0.112	0.496	0.436	0.011	0.27	0.0229	0.1309	0.0032
52	0.106	0.183	0.106	0.185	0.279	0.280	0.175	0.174	0.494	0.454	0.011	0.27	0.0094	0.0405	0.0010
53	0.193	0.195	0.194	0.201	0.212	0.214	0.070	0.071	0.496	0.412	0.011	0.27	0.0337	0.2234	0.0067
54	0.298	0.294	0.307	0.308	0.538	0.543	0.066	0.069	0.448	0.418	0.011	0.27	0.0847	0.6463	0.0098
55	0.553	0.557	0.530	0.618	0.493	0.505	0.245	0.253	0.610	0.400	0.011	0.27	0.0576	0.6131	0.0084
56	0.316	0.548	0.313	0.563	0.833	0.836	0.527	0.526	0.574	0.440	0.011	0.27	0.0178	0.1115	0.0014

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS 9

NB=15 NY=25 RHO=0.249

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_R10	BIAS_B20	BIAS_B1R	BIAS_B2R
57	0.5	0.01	0.0	1.0661	0.173	0.174	0.356	0.357	0.080	0.082	0.082	0.083	0.005	-0.017	-0.019	-0.041
58	0.5	0.01	0.4	1.0661	0.214	0.215	0.316	0.317	0.104	0.104	0.074	0.074	0.002	-0.017	-0.017	-0.036
59	0.5	0.01	0.8	1.0661	0.263	0.263	0.205	0.205	0.162	0.162	0.049	0.049	-0.002	-0.014	-0.010	-0.022
60	0.5	0.05	0.0	1.0661	0.218	0.219	0.374	0.375	0.072	0.075	0.086	0.087	0.008	-0.018	-0.019	-0.044
61	0.5	0.20	0.0	1.0661	0.545	0.547	0.576	0.579	0.074	0.080	0.128	0.130	0.021	-0.020	-0.039	-0.078
62	1.5	0.01	0.0	1.0661	0.512	0.521	1.065	1.069	0.240	0.252	0.246	0.249	0.014	-0.051	-0.005	-0.204
63	1.5	0.01	0.8	1.0661	0.783	0.786	0.611	0.612	0.489	0.489	0.147	0.147	-0.006	-0.041	-0.011	-0.096

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
57	0.194	0.203	0.192	0.203	0.176	0.176	0.083	0.084	0.488	0.494	-0.001	0.264	0.0299	0.2167	0.0043
58	0.169	0.197	0.169	0.197	0.216	0.216	0.105	0.105	0.482	0.494	-0.001	0.264	0.0237	0.1113	0.0042
59	0.111	0.178	0.111	0.178	0.263	0.263	0.162	0.162	0.486	0.476	-0.001	0.640	0.0100	0.0394	0.0012
60	0.204	0.212	0.202	0.213	0.220	0.220	0.076	0.077	0.504	0.468	-0.001	0.264	0.0333	0.2650	0.0045
61	0.316	0.319	0.311	0.319	0.547	0.547	0.077	0.079	0.524	0.490	-0.001	0.264	0.0844	0.9853	0.0133
62	0.580	0.607	0.551	0.650	0.521	0.527	0.251	0.256	0.682	0.432	-^.001	0.264	0.0556	0.5666	0.0064
63	0.332	0.533	0.326	0.545	0.786	0.787	0.489	0.489	0.578	0.450	-0.001	0.264	0.0187	0.0915	0.0021

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=15 NY=25 RHO=0.5

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
64	0.5	0.01	0.0	1.33333	0.165	0.164	0.355	0.356	0.077	0.076	0.082	0.082	0.001	-0.025	-0.018	-0.045
65	0.5	0.01	0.4	1.33333	0.217	0.217	0.315	0.315	0.112	0.112	0.076	0.076	-0.004	-0.030	-0.019	-0.045
66	0.5	0.01	0.8	1.33333	0.268	0.268	0.204	0.204	0.180	0.180	0.049	0.049	-0.005	-0.026	-0.012	-0.032
67	0.5	0.05	0.0	1.33333	0.209	0.208	0.374	0.375	0.066	0.066	0.084	0.085	0.001	-0.025	-0.020	-0.047
68	0.5	0.20	0.0	1.33333	0.534	0.531	0.578	0.581	0.066	0.063	0.126	0.127	0.003	-0.026	-0.043	-0.075
69	1.5	0.01	0.0	1.33333	0.490	0.493	1.062	1.066	0.233	0.234	0.244	0.247	0.002	-0.074	0.027	-0.237
70	1.5	0.01	0.8	1.33333	0.799	0.800	0.608	0.609	0.543	0.544	0.148	0.149	-0.016	-0.077	-0.004	-0.137

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
64	0.219	0.213	0.208	0.206	0.184	0.180	0.091	0.086	0.570	0.510	-0.012	0.215	0.0296	0.1495	0.0027
65	0.195	0.205	0.187	0.199	0.231	0.228	0.116	0.114	0.556	0.504	-0.012	0.215	0.0234	0.1068	0.0032
66	0.125	0.192	0.123	0.190	0.273	0.273	0.179	0.179	0.518	0.532	-0.012	0.215	0.0099	0.0434	0.0011
67	0.228	0.224	0.216	0.216	0.226	0.221	0.082	0.076	0.560	0.514	-0.012	0.215	0.0328	0.1250	0.0049
68	0.351	0.350	0.317	0.322	0.554	0.543	0.089	0.074	0.616	0.560	-0.012	0.215	0.0779	1.0000	0.0061
69	0.658	0.639	0.598	0.662	0.547	0.541	0.277	0.263	0.762	0.404	-0.012	0.215	0.0545	0.3262	0.0041
70	0.375	0.575	0.360	0.586	0.817	0.816	0.541	0.542	0.680	0.456	-0.012	0.215	0.0186	0.0765	0.0016

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=15 NY=25 RHO=0.75

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
71	0.5	0.01	0.0	2.28571	0.173	0.167	0.360	0.360	0.077	0.074	0.084	0.084	0.004	-0.007	-0.012	-0.023
72	0.5	0.01	0.4	2.28571	0.219	0.215	0.317	0.317	0.112	0.112	0.077	0.078	0.000	-0.009	-0.013	-0.022
73	0.5	0.01	0.8	2.28571	0.274	0.273	0.201	0.201	0.178	0.178	0.050	0.050	0.002	-0.016	-0.003	-0.021
74	0.5	0.05	0.0	2.28571	0.216	0.210	0.377	0.378	0.067	0.064	0.086	0.086	0.008	-0.008	-0.009	-0.026
75	0.5	0.20	0.0	2.28571	0.543	0.535	0.575	0.578	0.071	0.065	0.121	0.122	0.026	-0.016	-0.013	-0.053
76	1.5	0.01	0.0	2.28571	0.514	0.496	1.076	1.082	0.233	0.226	0.251	0.254	0.008	-0.019	0.108	-0.237
77	1.5	0.01	0.8	2.28571	0.816	0.814	0.600	0.602	0.536	0.538	0.147	0.148	0.005	-0.047	0.054	-0.137

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
71	0.274	0.296	0.244	0.266	0.229	0.211	0.119	0.103	0.770	0.740	-0.008	0.133	0.0291	0.0923	0.0046
72	0.253	0.273	0.231	0.251	0.261	0.250	0.133	0.126	0.730	0.706	-0.008	0.133	0.0230	0.0935	0.0034
73	0.171	0.224	0.164	0.217	0.294	0.291	0.177	0.176	0.666	0.646	-0.008	0.133	0.0095	0.0473	0.0014
74	0.282	0.304	0.250	0.271	0.268	0.250	0.107	0.091	0.774	0.754	-0.008	0.133	0.0317	0.0966	0.0051
75	0.449	0.462	0.371	0.384	0.599	0.568	0.134	0.103	0.788	0.798	-0.008	0.133	0.0706	0.3739	0.0101
76	0.825	0.891	0.707	0.830	0.682	0.634	0.361	0.311	0.678	0.496	-0.008	0.133	0.0540	0.2609	0.0043
77	0.508	0.668	0.480	0.668	0.877	0.872	0.532	0.531	0.576	0.434	-0.008	0.133	0.0180	0.0894	0.0025

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=15 NY=25 RHO=0.9

EXP NO	BETA 2	SD ZETA	RHO C	VIF	MTSE OLS	MTSE RGE	MOSE OLS	MOSE RGE	STSE OLS	STSE RGE	SOSE OLS	SOSE RGE	BIAS B10	BIAS B20	BIAS B1R	BIAS R2R
78	0.5	0.01	0.0	5.26316	0.178	0.165	0.366	0.368	0.090	0.083	0.090	0.091	0.005	0.011	-0.008	-0.004
79	0.5	0.01	0.4	5.26316	0.219	0.212	0.320	0.321	0.119	0.117	0.075	0.075	-0.015	0.016	-0.023	0.001
80	0.5	0.01	0.8	5.26316	0.275	0.273	0.204	0.204	0.182	0.182	0.048	0.048	-0.014	0.001	-0.019	-0.005
81	0.5	0.05	0.0	5.26316	0.221	0.209	0.381	0.383	0.081	0.072	0.092	0.093	0.005	0.005	-0.009	-0.011
82	0.5	0.20	0.0	5.26316	0.540	0.527	0.576	0.579	0.079	0.066	0.125	0.126	0.005	-0.017	-0.027	-0.047
83	1.5	0.01	0.0	5.26316	0.527	0.490	1.098	1.105	0.272	0.246	0.270	0.274	0.015	0.037	0.220	-0.270
84	1.5	0.01	0.8	5.26316	0.819	0.816	0.609	0.610	0.549	0.551	0.143	0.144	-0.043	0.005	0.078	-0.152

EXP NO	RMSE B10	RMSE B20	RMSE B1R	RMSE B2R	MTSE0 O	MTSE0 R	STSE0 O	STSE0 R	P RGE1	P RGE2	BIAS RHO	RMSE RHO	K MEAN	K MAX	K MIN
78	0.476	0.468	0.385	0.376	0.328	0.273	0.232	0.186	0.872	0.868	-0.0088	0.0715	0.0281	0.2756	0.0042
79	0.405	0.409	0.336	0.341	0.332	0.295	0.201	0.172	0.864	0.856	-0.0088	0.0715	0.0222	0.1098	0.0030
80	0.248	0.296	0.223	0.272	0.328	0.317	0.190	0.185	0.816	0.816	-0.0088	0.0715	0.0096	0.0489	0.0016
81	0.506	0.498	0.404	0.397	0.371	0.313	0.237	0.185	0.888	0.892	-0.0088	0.0715	0.0302	0.2691	0.0023
82	0.750	0.741	0.547	0.540	0.721	0.623	0.296	0.211	0.888	0.882	-0.0088	0.0715	0.0633	0.3061	0.0042
83	1.421	1.397	1.122	1.140	0.977	0.826	0.691	0.526	0.692	0.602	-0.0088	0.0715	0.0500	0.4567	0.0051
84	0.736	0.879	0.650	0.827	0.977	0.951	0.569	0.553	0.602	0.524	-0.0088	0.0715	0.0178	0.1246	0.0026

TABLE IA. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NS=15 NY=25 RHO=0.95

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
85	0.5	0.01	0.0	10.2564	0.167	0.154	0.361	0.362	0.082	0.076	0.087	0.088	0.008	-0.031	-0.011	-0.038
86	0.5	0.01	0.4	10.2564	0.214	0.206	0.316	0.317	0.117	0.117	0.075	0.075	0.004	-0.019	-0.006	-0.030
87	0.5	0.01	0.8	10.2564	0.269	0.266	0.203	0.203	0.182	0.183	0.048	0.049	0.000	-0.010	-0.005	-0.015
88	0.5	0.05	0.0	10.2564	0.212	0.200	0.377	0.379	0.071	0.065	0.089	0.090	0.015	-0.040	-0.007	-0.046
89	0.5	0.20	0.0	10.2564	0.536	0.522	0.576	0.581	0.065	0.057	0.121	0.123	0.042	-0.073	-0.003	-0.062
90	1.5	0.01	0.0	10.2564	0.495	0.461	1.079	1.087	0.248	0.229	0.261	0.265	0.020	-0.090	0.277	-0.442
91	1.5	0.01	0.8	10.2564	0.801	0.796	0.606	0.608	0.550	0.550	0.146	0.147	-0.005	-0.025	0.178	-0.243

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
85	0.593	0.609	0.435	0.452	0.401	0.303	0.302	0.224	0.912	0.916	-0.007	0.035	0.0265	0.1690	0.0020
86	0.515	0.523	0.398	0.408	0.396	0.327	0.249	0.201	0.910	0.890	-0.007	0.035	0.0211	0.0975	0.0024
87	0.334	0.368	0.286	0.322	0.361	0.337	0.206	0.196	0.896	0.892	-0.007	0.035	0.0093	0.0487	0.0013
88	0.613	0.629	0.445	0.463	0.440	0.340	0.299	0.216	0.912	0.914	-0.007	0.035	0.0287	0.1883	0.0037
89	0.913	0.932	0.583	0.606	0.819	0.647	0.369	0.234	0.900	0.912	-0.007	0.035	0.0567	0.3642	0.0050
90	1.780	1.826	1.288	1.405	1.200	0.959	0.908	0.618	0.698	0.630	-0.007	0.035	0.0503	0.2811	0.0023
91	1.000	1.103	0.849	0.992	1.078	1.019	0.624	0.584	0.636	0.534	-0.007	0.035	0.0174	0.1446	0.0014

NB=15 NY=25 RHO=0.989

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
92	0.5	0.01	0.0	45.7059	0.170	0.147	0.360	0.363	0.080	0.074	0.087	0.088	0.084	-0.087	0.041	-0.062
93	0.5	0.01	0.4	45.7059	0.221	0.206	0.314	0.316	0.108	0.110	0.077	0.078	0.027	-0.034	-0.001	-0.021
94	0.5	0.01	0.8	45.7059	0.268	0.263	0.201	0.202	0.175	0.177	0.051	0.052	-0.015	0.002	-0.018	-0.003
95	0.5	0.05	0.0	45.7059	0.215	0.196	0.375	0.378	0.070	0.063	0.090	0.091	0.062	-0.065	0.030	-0.052
96	0.5	0.20	0.0	45.7059	0.542	0.523	0.573	0.579	0.067	0.056	0.131	0.132	-0.018	0.018	-0.013	-0.020
97	1.5	0.01	0.0	45.7059	0.503	0.435	1.079	1.089	0.242	0.225	0.261	0.264	0.262	-0.273	0.557	-0.629
98	1.5	0.01	0.8	45.7059	0.799	0.784	0.600	0.604	0.527	0.532	0.153	0.155	-0.033	-0.009	0.308	-0.376

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
92	1.277	1.291	0.757	0.771	0.828	0.453	0.652	0.442	0.958	0.954	-0.0012	0.0081	0.0183	0.1303	0.0011
93	1.125	1.141	0.703	0.719	0.780	0.478	0.536	0.384	0.954	0.954	-0.0012	0.0081	0.0151	0.1338	0.0006
94	0.733	0.757	0.517	0.542	0.576	0.441	0.356	0.284	0.954	0.918	-0.0012	0.0081	0.0075	0.0507	0.0005
95	1.337	1.354	0.796	0.812	0.881	0.497	0.676	0.457	0.946	0.952	-0.0012	0.0081	0.0195	0.1371	0.0009
96	2.124	2.148	1.240	1.263	1.494	0.907	1.025	0.678	0.960	0.950	-0.0012	0.0081	0.0364	0.3754	0.0007
97	3.827	3.866	2.250	2.318	2.481	1.445	1.954	1.220	0.818	0.786	-0.0012	0.0081	0.0316	0.1927	0.0010
98	2.188	2.258	1.528	1.626	1.720	1.349	1.060	0.790	0.748	0.712	-0.0012	0.0081	0.0137	0.1021	0.0004

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=10 RHO=0

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_R2R
99	0.5	0.01	0.0	1	0.202	0.203	0.578	0.580	0.091	0.092	0.100	0.101	0.005	-0.010	-0.036	-0.052
100	0.5	0.01	0.4	1	0.307	0.309	0.505	0.505	0.176	0.177	0.091	0.092	-0.006	-0.011	-0.037	-0.043
101	0.5	0.01	0.8	1	0.420	0.420	0.326	0.326	0.294	0.294	0.058	0.058	-0.004	-0.010	-0.018	-0.023
102	0.5	0.05	0.0	1	0.239	0.241	0.590	0.591	0.080	0.082	0.101	0.102	0.004	-0.009	-0.038	-0.052
103	0.5	0.20	0.0	1	0.533	0.535	0.738	0.740	0.060	0.062	0.123	0.124	0.001	-0.005	-0.063	-0.070
104	1.5	0.01	0.0	1	0.600	0.611	1.734	1.740	0.275	0.285	0.300	0.302	0.016	-0.031	-0.052	-0.247
105	1.5	0.01	0.8	1	1.258	1.260	0.975	0.977	0.885	0.886	0.174	0.175	-0.013	-0.030	-0.038	-0.105

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
99	0.212	0.221	0.214	0.226	0.202	0.203	0.091	0.092	0.472	0.446	0.023	0.207	0.0444	0.1844	0.0112
100	0.191	0.240	0.195	0.242	0.307	0.309	0.176	0.177	0.462	0.426	0.023	0.207	0.0340	0.1354	0.0089
101	0.124	0.270	0.126	0.270	0.420	0.420	0.294	0.294	0.430	0.482	0.023	0.207	0.0141	0.0504	0.0043
102	0.218	0.225	0.220	0.230	0.239	0.241	0.080	0.082	0.482	0.442	0.023	0.207	0.0463	0.2027	0.0115
103	0.280	0.278	0.286	0.285	0.533	0.535	0.060	0.062	0.434	0.430	0.023	0.207	0.0749	0.5887	0.0133
104	0.636	0.664	0.601	0.733	0.600	0.611	0.275	0.285	0.600	0.418	0.023	0.207	0.0839	0.6117	0.0175
105	0.373	0.809	0.369	0.826	1.258	1.260	0.885	0.886	0.482	0.476	0.023	0.207	0.0282	0.1993	0.0058

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=10 RHO=0.249

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
106	0.5	0.01	0.0	1.0661	0.199	0.201	0.585	0.586	0.098	0.100	0.108	0.108	-0.006	-0.011	-0.040	-0.047
107	0.5	0.01	0.4	1.0661	0.296	0.297	0.517	0.517	0.169	0.170	0.095	0.095	-0.006	-0.019	-0.033	-0.047
108	0.5	0.01	0.8	1.0661	0.406	0.407	0.334	0.334	0.296	0.296	0.06[illegible]	0.063	-0.003	-0.027	-0.015	-0.039
109	0.5	0.05	0.0	1.0661	0.236	0.238	0.597	0.598	0.087	0.088	0.110	0.110	-0.007	-0.012	-0.042	-0.049
110	0.5	0.20	0.0	1.0661	0.530	0.531	0.746	0.748	0.060	0.061	0.130	0.131	-0.009	-0.015	-0.062	-0.071
111	1.5	0.01	0.0	1.0661	0.593	0.599	1.753	1.759	0.295	0.302	0.324	0.326	-0.019	-0.033	-0.043	-0.246
112	1.5	0.01	0.8	1.0661	1.216	1.219	1.000	1.002	0.890	0.892	0.189	0.189	-0.009	-0.081	-0.019	-0.158

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
106	0.222	0.231	0.221	0.230	0.203	0.203	0.100	0.100	0.478	0.474	-0.007	0.186	0.0458	0.1742	0.0104
107	0.196	0.231	0.196	0.231	0.299	0.298	0.170	0.170	0.482	0.452	-0.007	0.186	0.0359	0.1424	0.0074
108	0.130	0.263	0.130	0.263	0.408	0.408	0.296	0.296	0.486	0.446	-0.007	0.186	0.0151	0.0683	0.0029
109	0.226	0.234	0.225	0.233	0.240	0.240	0.090	0.089	0.482	0.478	-0.007	0.186	0.0478	0.1959	0.0105
110	0.284	0.285	0.280	0.284	0.533	0.532	0.065	0.062	0.490	0.456	-0.007	0.186	0.0755	0.3686	0.0166
111	0.664	0.691	0.611	0.742	0.605	0.605	0.302	0.303	0.734	0.412	-0.007	0.186	0.0843	0.5233	0.0167
112	0.391	0.790	0.379	0.809	1.220	1.222	0.889	0.890	0.656	0.420	-0.007	0.186	0.0301	0.2077	0.0050

NB=25 NY=10 RHO=0.5

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
113	0.5	0.01	0.0	1.33333	0.200	0.199	0.576	0.577	0.090	0.091	0.102	0.103	-0.009	-0.028	-0.035	-0.057
114	0.5	0.01	0.4	1.33333	0.303	0.304	0.513	0.514	0.172	0.172	0.094	0.094	-0.010	-0.035	-0.032	-0.057
115	0.5	0.01	0.8	1.33333	0.413	0.413	0.330	0.330	0.292	0.292	0.060	0.060	-0.005	-0.020	-0.015	-0.029
116	0.5	0.05	0.0	1.33333	0.237	0.237	0.587	0.587	0.080	0.081	0.103	0.104	-0.007	-0.028	-0.035	-0.057
117	0.5	0.20	0.0	1.33333	0.530	0.530	0.733	0.734	0.059	0.058	0.122	0.122	-0.001	-0.028	-0.042	-0.071
118	1.5	0.01	0.0	1.33333	0.594	0.599	1.726	1.731	0.271	0.284	0.307	0.309	-0.028	-0.085	0.006	-0.311
119	1.5	0.01	0.8	1.33333	1.235	1.237	0.988	0.989	0.876	0.878	0.179	0.180	-0.017	-0.062	-0.003	-0.144

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
113	0.238	0.247	0.228	0.239	0.217	0.212	0.100	0.096	0.556	0.524	-0.004	0.158	0.0435	0.1433	0.0131
114	0.223	0.258	0.215	0.251	0.316	0.313	0.173	0.171	0.516	0.506	-0.004	0.158	0.0349	0.1195	0.0100
115	0.145	0.271	0.143	0.268	0.419	0.418	0.289	0.289	0.498	0.542	-0.004	0.158	0.0144	0.0462	0.0036
116	0.244	0.251	0.234	0.242	0.253	0.248	0.091	0.087	0.556	0.516	-0.004	0.158	0.0450	0.1504	0.0135
117	0.313	0.309	0.294	0.293	0.543	0.538	0.072	0.065	0.586	0.524	-0.004	0.158	0.0693	0.2457	0.0188
118	0.712	0.742	0.634	0.787	0.647	0.639	0.303	0.301	0.786	0.392	-0.004	0.158	0.0821	0.5085	0.0151
119	0.434	0.814	0.416	0.826	1.253	1.253	0.869	0.870	0.702	0.472	-0.004	0.158	0.0289	0.1984	0.0052

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=10 RHO=0.75

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
120	0.5	0.01	0.0	2.28571	0.212	0.204	0.578	0.579	0.091	0.089	0.096	0.096	-0.014	0.007	-0.032	-0.019
121	0.5	0.01	0.4	2.28571	0.301	0.296	0.508	0.509	0.165	0.166	0.095	0.095	-0.008	-0.011	-0.025	-0.030
122	0.5	0.01	0.8	2.28571	0.406	0.406	0.327	0.327	0.291	0.291	0.062	0.062	-0.009	-0.023	-0.017	-0.030
123	0.5	0.05	0.0	2.28571	0.248	0.241	0.588	0.589	0.082	0.080	0.095	0.095	-0.017	0.010	-0.035	-0.017
124	0.5	0.20	0.0	2.28571	0.538	0.532	0.728	0.730	0.065	0.062	0.115	0.116	-0.028	0.022	-0.053	-0.021
125	1.5	0.01	0.0	2.28571	0.631	0.610	1.734	1.740	0.275	0.269	0.288	0.291	-0.041	0.019	0.084	-0.261
126	1.5	0.01	0.8	2.28571	1.215	1.216	0.979	0.980	0.876	0.877	0.187	0.187	-0.025	-0.071	0.032	-0.186

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
120	0.349	0.346	0.310	0.308	0.279	0.256	0.149	0.132	0.770	0.734	-0.003	0.093	0.0404	0.1564	0.0100
121	0.311	0.327	0.281	0.299	0.347	0.333	0.180	0.174	0.756	0.732	-0.003	0.093	0.0324	0.1348	0.0062
122	0.192	0.292	0.184	0.283	0.425	0.421	0.285	0.285	0.664	0.678	-0.003	0.093	0.0141	0.0562	0.0027
123	0.356	0.353	0.316	0.314	0.311	0.289	0.142	0.124	0.770	0.734	-0.003	0.093	0.0417	0.1634	0.0112
124	0.440	0.434	0.377	0.373	0.591	0.566	0.127	0.104	0.784	0.738	-0.003	0.093	0.0633	0.2631	0.0077
125	1.044	1.035	0.886	0.969	0.833	0.771	0.447	0.385	0.702	0.486	-0.003	0.093	0.0738	0.3842	0.0090
126	0.574	0.877	0.532	0.878	1.272	1.266	0.857	0.856	0.612	0.452	-0.003	0.093	0.0291	0.6685	0.0036

TABLE IA. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=10 RHO=0.9

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
127	0.5	0.01	0.0	5.26316	0.214	0.202	0.588	0.589	0.094	0.092	0.103	0.104	-0.030	0.005	-0.043	-0.022
128	0.5	0.01	0.4	5.26316	0.312	0.306	0.512	0.513	0.169	0.170	0.089	0.090	-0.017	-0.010	-0.029	-0.030
129	0.5	0.01	0.8	5.26316	0.414	0.413	0.328	0.329	0.266	0.266	0.057	0.057	-0.009	-0.023	-0.017	-0.029
130	0.5	0.05	0.0	5.26316	0.248	0.237	0.597	0.599	0.083	0.081	0.105	0.106	-0.029	0.004	-0.042	-0.024
131	0.5	0.20	0.0	5.26316	0.535	0.525	0.740	0.742	0.061	0.057	0.131	0.131	-0.025	0.000	-0.042	-0.041
132	1.5	0.01	0.0	5.26316	0.639	0.606	1.762	1.770	0.283	0.280	0.309	0.312	-0.089	0.014	0.161	-0.376
133	1.5	0.01	0.8	5.26316	1.240	1.238	0.983	0.985	0.799	0.800	0.171	0.172	-0.027	-0.068	0.115	-0.263

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
127	0.494	0.506	0.385	0.395	0.374	0.304	0.217	0.171	0.876	0.874	-0.0058	0.047	0.0397	0.1394	0.0065
128	0.426	0.450	0.346	0.370	0.421	0.378	0.209	0.190	0.864	0.846	-0.0058	0.047	0.0316	0.0989	0.0051
129	0.272	0.360	0.243	0.331	0.465	0.453	0.256	0.256	0.782	0.828	-0.0058	0.047	0.0139	0.0601	0.0023
130	0.501	0.513	0.389	0.399	0.401	0.332	0.211	0.153	0.902	0.892	-0.0058	0.047	0.0409	0.1535	0.0066
131	0.628	0.637	0.460	0.470	0.677	0.599	0.215	0.149	0.860	0.860	-0.0058	0.047	0.0594	0.2336	0.0102
132	1.481	1.517	1.098	1.236	1.120	0.923	0.652	0.485	0.743	0.610	-0.0058	0.047	0.0748	0.5478	0.0053
133	0.812	1.077	0.706	1.029	1.392	1.366	0.770	0.757	0.606	0.490	-0.0058	0.047	0.0278	0.2484	0.0023

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=10 RHO=0.95

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
134	0.5	0.01	0.0	10.2564	0.209	0.192	0.578	0.580	0.090	0.087	0.101	0.101	-0.003	-0.014	-0.019	-0.032
135	0.5	0.01	0.4	10.2564	0.316	0.305	0.507	0.508	0.173	0.176	0.090	0.090	-0.001	-0.020	-0.017	-0.030
136	0.5	0.01	0.8	10.2564	0.437	0.434	0.329	0.329	0.295	0.296	0.056	0.057	-0.001	-0.021	-0.012	-0.023
137	0.5	0.05	0.0	10.2564	0.244	0.229	0.589	0.591	0.080	0.077	0.104	0.105	-0.002	-0.016	-0.019	-0.035
138	0.5	0.20	0.0	10.2564	0.533	0.520	0.736	0.739	0.058	0.052	0.129	0.130	0.001	-0.026	-0.024	-0.052
139	1.5	0.01	0.0	10.2564	0.621	0.573	1.733	1.742	0.271	0.262	0.302	0.304	-0.008	-0.040	0.304	-0.472
140	1.5	0.01	0.8	10.2564	1.309	1.302	0.984	0.987	0.886	0.891	0.169	0.170	-0.003	-0.063	0.200	-0.314

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
134	0.685	0.679	0.481	0.476	0.482	0.346	0.312	0.227	0.922	0.908	-0.002	0.026	0.0352	0.1392	0.0040
135	0.623	0.645	0.457	0.478	0.535	0.435	0.284	0.233	0.912	0.888	-0.002	0.026	0.0277	0.0785	0.0039
136	0.397	0.475	0.326	0.401	0.541	0.506	0.290	0.285	0.864	0.890	-0.002	0.026	0.0130	0.0570	0.0030
137	0.704	0.696	0.492	0.487	0.513	0.377	0.308	0.222	0.918	0.922	-0.002	0.026	0.0362	0.1561	0.0045
138	0.903	0.887	0.600	0.589	0.804	0.644	0.349	0.231	0.932	0.926	-0.002	0.026	0.0520	0.2727	0.0035
139	2.051	2.033	1.394	1.471	1.440	1.076	0.938	0.614	0.756	0.650	-0.002	0.026	0.0633	0.3403	0.0035
140	1.188	1.424	0.958	1.237	1.619	1.525	0.872	0.849	0.666	0.606	-0.002	0.026	0.0261	0.1855	0.0031

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=10 RHO=0.989

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
141	0.5	0.01	0.0	45.7059	0.207	0.181	0.588	0.591	0.096	0.090	0.104	0.104	0.111	-0.130	0.068	-0.111
142	0.5	0.01	0.4	45.7059	0.309	0.292	0.513	0.515	0.171	0.175	0.088	0.089	0.077	-0.089	0.039	-0.070
143	0.5	0.01	0.8	45.7059	0.423	0.417	0.332	0.333	0.291	0.293	0.057	0.057	0.029	-0.043	0.018	-0.041
144	0.5	0.05	0.0	45.7059	0.243	0.220	0.599	0.602	0.085	0.078	0.105	0.105	0.106	-0.127	0.060	-0.105
145	0.5	0.20	0.0	45.7059	0.533	0.516	0.742	0.747	0.059	0.050	0.121	0.122	0.089	-0.117	0.032	-0.092
146	1.5	0.01	0.0	45.7059	0.617	0.541	1.764	1.774	0.289	0.272	0.311	0.312	0.335	-0.392	0.654	-0.792
147	1.5	0.01	0.8	45.7059	1.264	1.248	0.995	0.999	0.875	0.882	0.170	0.171	0.087	-0.128	0.431	-0.506

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
141	1.584	1.597	0.970	0.984	1.004	0.535	0.836	0.608	0.948	0.960	-0.0008	0.0057	0.0254	0.1593	0.0005
142	1.455	1.461	0.913	0.919	0.993	0.610	0.724	0.528	0.960	0.938	-0.0008	0.0057	0.0196	0.1131	0.0011
143	0.918	0.950	0.626	0.658	0.773	0.600	0.466	0.385	0.938	0.934	-0.0008	0.0057	0.0105	0.0559	0.0011
144	1.614	1.630	0.986	1.001	1.037	0.567	0.843	0.607	0.966	0.970	-0.0008	0.0057	0.0260	0.1426	0.0005
145	1.984	1.997	1.175	1.186	1.397	0.859	0.963	0.653	0.962	0.966	-0.0008	0.0057	0.0342	0.1769	0.0009
146	4.746	4.784	2.889	2.960	3.005	1.692	2.505	1.731	0.844	0.842	-0.0008	0.0057	0.0447	0.2866	0.0005
147	2.744	2.841	1.847	1.968	2.316	1.824	1.391	1.095	0.804	0.766	-0.0008	0.0057	0.0198	0.1350	0.0009

TABLE IA. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=25 RHO=0

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
148	0.5	0.01	0.0	1	0.123	0.124	0.368	0.368	0.055	0.055	0.068	0.068	-0.007	-0.007	-0.025	-0.025
149	0.5	0.01	0.4	1	0.187	0.188	0.322	0.322	0.096	0.096	0.057	0.058	-0.007	-0.012	-0.020	-0.026
150	0.5	0.01	0.8	1	0.263	0.264	0.206	0.206	0.177	0.177	0.036	0.036	-0.003	-0.010	-0.009	-0.016
151	0.5	0.05	0.0	1	0.174	0.175	0.384	0.384	0.045	0.045	0.070	0.070	-0.007	-0.006	-0.026	-0.026
152	0.5	0.20	0.0	1	0.504	0.505	0.582	0.583	0.041	0.042	0.092	0.092	-0.006	-0.005	-0.049	-0.049
153	1.5	0.01	0.0	1	0.362	0.367	1.102	1.104	0.166	0.169	0.203	0.203	-0.022	-0.020	-0.053	-0.115
154	1.5	0.01	0.8	1	0.785	0.786	0.615	0.615	0.536	0.536	0.108	0.108	-0.009	-0.030	-0.020	-0.061

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
148	0.131	0.140	0.133	0.141	0.123	0.124	0.055	0.055	0.442	0.470	-0.007	0.203	0.0176	0.0588	0.0030
149	0.121	0.149	0.123	0.150	0.187	0.188	0.096	0.096	0.468	0.448	-0.007	0.203	0.0136	0.0460	0.0041
150	0.079	0.164	0.079	0.165	0.263	0.264	0.177	0.177	0.492	0.444	-0.007	0.203	0.0055	0.0172	0.0015
151	0.136	0.148	0.138	0.150	0.174	0.175	0.045	0.045	0.448	0.456	-0.007	0.203	0.0192	0.0638	0.0036
152	0.212	0.227	0.218	0.233	0.504	0.505	0.041	0.042	0.470	0.462	-0.007	0.203	0.0455	0.1927	0.0092
153	0.395	0.417	0.387	0.441	0.362	0.367	0.166	0.169	0.536	0.446	-0.007	0.203	0.0320	0.1295	0.0049
154	0.235	0.491	0.234	0.498	0.785	0.786	0.536	0.536	0.526	0.438	-0.007	0.203	0.0103	0.0375	0.0022

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=25 RHO=0.249

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
155	0.5	0.01	0.0	1.0661	0.126	0.126	0.359	0.359	0.057	0.057	0.065	0.065	0.011	-0.014	-0.002	-0.027
156	0.5	0.01	0.4	1.0661	0.189	0.189	0.316	0.316	0.111	0.111	0.058	0.059	0.006	-0.008	-0.004	-0.019
157	0.5	0.01	0.8	1.0661	0.262	0.262	0.203	0.203	0.182	0.182	0.037	0.037	0.001	-0.002	-0.003	-0.007
158	0.5	0.05	0.0	1.0661	0.178	0.178	0.374	0.375	0.045	0.045	0.066	0.066	0.011	-0.013	-0.003	-0.027
159	0.5	0.20	0.0	1.0661	0.503	0.503	0.573	0.574	0.035	0.035	0.092	0.093	0.013	-0.011	-0.019	-0.043
160	1.5	0.01	0.0	1.0661	0.370	0.373	1.074	1.075	0.174	0.178	0.194	0.194	0.032	-0.042	0.024	-0.128
161	1.5	0.01	0.8	1.0661	0.782	0.783	0.605	0.606	0.548	0.548	0.112	0.112	0.003	-0.008	0.001	-0.036

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
155	0.140	0.143	0.138	0.143	0.129	0.129	0.059	0.059	0.500	0.450	0.02	0.185	0.0164	0.0626	0.0041
156	0.124	0.158	0.123	0.157	0.190	0.190	0.111	0.111	0.510	0.502	0.02	0.185	0.0127	0.0456	0.0029
157	0.079	0.173	0.079	0.173	0.263	0.263	0.181	0.181	0.496	0.478	0.02	0.185	0.0052	0.0132	0.0012
158	0.146	0.149	0.144	0.149	0.180	0.180	0.047	0.047	0.496	0.474	0.02	0.185	0.0178	0.0677	0.0057
159	0.219	0.219	0.215	0.218	0.505	0.504	0.036	0.035	0.508	0.492	0.02	0.185	0.0420	0.1319	0.0108
160	0.419	0.427	0.406	0.450	0.379	0.382	0.182	0.185	0.692	0.440	0.02	0.185	0.0301	0.1538	0.0064
161	0.234	0.519	0.232	0.521	0.784	0.785	0.540	0.548	0.650	0.464	0.02	0.185	0.0096	0.0353	0.0021

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=25 RHO=0.5

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
162	0.5	0.01	0.0	1.33333	0.126	0.125	0.356	0.356	0.056	0.055	0.062	0.062	0.003	-0.005	-0.008	-0.016
163	0.5	0.01	0.4	1.33333	0.190	0.190	0.314	0.315	0.110	0.110	0.054	0.054	0.004	-0.009	-0.004	-0.017
164	0.5	0.01	0.8	1.33333	0.268	0.268	0.204	0.204	0.179	0.179	0.036	0.036	0.002	-0.005	-0.002	-0.009
165	0.5	0.05	0.0	1.33333	0.176	0.176	0.373	0.373	0.045	0.044	0.063	0.063	0.004	-0.006	-0.008	-0.018
166	0.5	0.20	0.0	1.33333	0.503	0.502	0.575	0.576	0.038	0.036	0.092	0.092	0.005	-0.010	-0.022	-0.038
167	1.5	0.01	0.0	1.33333	0.370	0.372	1.067	1.068	0.170	0.171	0.186	0.187	0.010	-0.014	0.025	-0.110
168	1.5	0.01	0.8	1.33333	0.800	0.801	0.607	0.607	0.539	0.538	0.108	0.109	0.005	-0.014	0.011	-0.048

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
162	0.152	0.160	0.148	0.157	0.137	0.135	0.065	0.063	0.514	0.530	-0.011	0.163	0.0162	0.0452	0.0030
163	0.134	0.173	0.131	0.171	0.198	0.197	0.112	0.112	0.516	0.502	-0.011	0.163	0.0128	0.0406	0.0033
164	0.086	0.180	0.085	0.179	0.272	0.271	0.178	0.178	0.530	0.502	-0.011	0.163	0.0054	0.0154	0.0012
165	0.159	0.166	0.155	0.163	0.185	0.184	0.055	0.053	0.524	0.526	-0.011	0.163	0.0178	0.0490	0.0035
166	0.248	0.255	0.235	0.244	0.512	0.509	0.052	0.047	0.572	0.548	-0.011	0.163	0.0425	0.1244	0.0137
167	0.454	0.480	0.435	0.493	0.404	0.403	0.198	0.195	0.696	0.450	-0.011	0.163	0.0299	0.1074	0.0048
168	0.257	0.540	0.253	0.543	0.809	0.810	0.536	0.536	0.602	0.474	-0.011	0.163	0.0101	0.0420	0.0017

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

------------------------------ NB=25 NY=25 RHO=0.75 ------------------------------

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
169	0.5	0.01	0.0	2.28571	0.124	0.122	0.360	0.360	0.059	0.059	0.061	0.061	0.010	-0.009	0.001	-0.019
170	0.5	0.01	0.4	2.28571	0.186	0.185	0.317	0.317	0.100	0.100	0.054	0.054	0.001	-0.007	-0.006	-0.014
171	0.5	0.01	0.8	2.28571	0.249	0.249	0.205	0.205	0.171	0.171	0.036	0.036	-0.001	-0.005	-0.004	-0.008
172	0.5	0.05	0.0	2.28571	0.176	0.174	0.377	0.377	0.047	0.047	0.063	0.063	0.010	-0.009	0.001	-0.020
173	0.5	0.20	0.0	2.28571	0.503	0.501	0.579	0.579	0.040	0.037	0.094	0.094	0.011	-0.009	-0.009	-0.034
174	1.5	0.01	0.0	2.28571	0.365	0.361	1.077	1.079	0.181	0.180	0.183	0.184	0.030	-0.029	0.098	-0.164
175	1.5	0.01	0.8	2.28571	0.741	0.741	0.610	0.610	0.515	0.516	0.107	0.107	-0.002	-0.016	0.025	-0.065

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
169	0.209	0.211	0.197	0.200	0.165	0.158	0.094	0.088	0.732	0.658	-0.009	0.098	0.0164	0.0837	0.0042
170	0.180	0.211	0.172	0.203	0.215	0.211	0.110	0.108	0.694	0.628	-0.009	0.098	0.0128	0.0544	0.0034
171	0.111	0.185	0.109	0.183	0.261	0.260	0.168	0.168	0.666	0.582	-0.009	0.098	0.0054	0.0154	0.0014
172	0.216	0.219	0.203	0.206	0.211	0.204	0.083	0.076	0.738	0.666	-0.009	0.098	0.0179	0.0860	0.0049
173	0.324	0.328	0.288	0.292	0.537	0.525	0.079	0.066	0.762	0.730	-0.009	0.098	0.0411	0.1823	0.0093
174	0.627	0.633	0.580	0.621	0.489	0.475	0.283	0.264	0.550	0.450	-0.009	0.098	0.0297	0.1310	0.0067
175	0.332	0.556	0.323	0.558	0.779	0.778	0.506	0.506	0.492	0.448	-0.009	0.098	0.0100	0.0326	0.0018

NB=25 NY=25 RHO=0.9

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
176	0.5	0.01	0.0	5.26316	0.131	0.126	0.368	0.369	0.058	0.056	0.064	0.064	0.013	-0.026	0.004	-0.034
177	0.5	0.01	0.4	5.26316	0.195	0.193	0.321	0.321	0.114	0.115	0.056	0.056	0.012	-0.024	0.005	-0.031
178	0.5	0.01	0.8	5.26316	0.274	0.274	0.204	0.204	0.188	0.189	0.035	0.035	0.005	-0.021	0.002	-0.023
179	0.5	0.05	0.0	5.26316	0.181	0.178	0.386	0.386	0.047	0.045	0.066	0.066	0.011	-0.027	0.001	-0.036
180	0.5	0.20	0.0	5.26316	0.507	0.502	0.588	0.589	0.040	0.037	0.093	0.094	0.003	-0.028	-0.017	-0.049
181	1.5	0.01	0.0	5.26316	0.385	0.375	1.103	1.106	0.176	0.171	0.192	0.193	0.040	-0.079	0.194	-0.296
182	1.5	0.01	0.8	5.26316	0.818	0.817	0.608	0.609	0.568	0.570	0.104	0.104	0.016	-0.062	0.090	-0.156

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
176	0.319	0.312	0.278	0.272	0.231	0.207	-0.142	0.122	0.854	0.840	-0.0072	0.0463	0.0165	0.0477	0.0043
177	0.271	0.283	0.241	0.254	0.263	0.248	0.146	0.135	0.872	0.810	-0.0072	0.0463	0.0128	0.0391	0.0029
178	0.167	0.222	0.158	0.213	0.301	0.297	0.186	0.186	0.806	0.786	-0.0072	0.0463	0.0054	0.0146	0.0012
179	0.333	0.324	0.287	0.280	0.273	0.248	0.135	0.112	0.844	0.822	-0.0072	0.0463	0.0181	0.0499	0.0049
180	0.505	0.491	0.401	0.388	0.604	0.561	0.160	0.120	0.860	0.862	-0.0072	0.0463	0.0399	0.1088	0.0062
181	0.955	0.934	0.823	0.851	0.688	0.633	0.429	0.358	0.606	0.492	-0.0072	0.0463	0.0305	0.0913	0.0047
182	0.498	0.663	0.468	0.653	0.897	0.890	0.561	0.560	0.496	0.454	-0.0072	0.0463	0.0099	0.0502	0.0019

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=25 NY=25 RHO=0.95

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
183	0.5	0.01	0.0	10.2564	0.126	0.119	0.364	0.364	0.056	0.054	0.064	0.064	0.019	-0.027	0.007	-0.031
184	0.5	0.01	0.4	10.2564	0.190	0.185	0.319	0.319	0.104	0.105	0.054	0.055	0.007	-0.006	0.001	-0.012
185	0.5	0.01	0.8	10.2564	0.261	0.260	0.206	0.206	0.181	0.182	0.037	0.037	0.003	-0.004	0.000	-0.006
186	0.5	0.05	0.0	10.2564	0.177	0.171	0.382	0.383	0.046	0.043	0.065	0.065	0.017	-0.026	0.006	-0.031
187	0.5	0.20	0.0	10.2564	0.507	0.499	0.587	0.589	0.039	0.035	0.090	0.090	0.009	-0.022	-0.009	-0.038
188	1.5	0.01	0.0	10.2564	0.371	0.352	1.089	1.093	0.171	0.164	0.191	0.192	0.058	-0.081	0.284	-0.364
189	1.5	0.01	0.8	10.2564	0.777	0.774	0.613	0.614	0.546	0.548	0.110	0.110	0.010	-0.012	0.136	-0.157

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
183	0.417	0.420	0.332	0.335	0.291	0.237	0.197	0.157	0.922	0.916	-0.003	0.024	0.0154	0.0493	0.0037
184	0.364	0.375	0.299	0.311	0.314	0.277	0.164	0.140	0.912	0.908	-0.003	0.024	0.0119	0.0380	0.0036
185	0.247	0.290	0.223	0.266	0.325	0.314	0.180	0.177	0.868	0.876	-0.003	0.024	0.0052	0.0172	0.0013
186	0.448	0.448	0.354	0.355	0.338	0.282	0.198	0.154	0.926	0.914	-0.003	0.024	0.0168	0.0529	0.0038
187	0.723	0.720	0.522	0.518	0.708	0.608	0.265	0.186	0.916	0.890	-0.003	0.024	0.0357	0.1383	0.0038
188	1.245	1.253	0.981	1.034	0.865	0.730	0.590	0.448	0.664	0.612	-0.003	0.024	0.0282	0.1101	0.0032
189	0.735	0.862	0.659	0.806	0.968	0.939	0.541	0.529	0.550	0.530	-0.003	0.024	0.0097	0.0537	0.0016

NB=25 NY=25 RHO=0.989

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
190	0.5	0.01	0.0	45.7059	0.130	0.117	0.363	0.364	0.057	0.055	0.062	0.062	0.009	-0.032	0.006	-0.040
191	0.5	0.01	0.4	45.7059	0.192	0.184	0.316	0.317	0.108	0.110	0.057	0.058	0.001	-0.014	0.005	-0.028
192	0.5	0.01	0.8	45.7059	0.265	0.262	0.204	0.204	0.182	0.184	0.036	0.037	-0.004	-0.007	0.001	-0.017
193	0.5	0.05	0.0	45.7059	0.178	0.168	0.381	0.382	0.045	0.042	0.065	0.065	0.035	-0.057	0.021	-0.057
194	0.5	0.20	0.0	45.7059	0.501	0.493	0.584	0.587	0.037	0.032	0.096	0.096	0.130	-0.151	0.042	-0.088
195	1.5	0.01	0.0	45.7059	0.385	0.344	1.087	1.092	0.175	0.168	0.186	0.187	0.015	-0.084	0.405	-0.515
196	1.5	0.01	0.8	45.7059	0.789	0.782	0.608	0.610	0.551	0.555	0.109	0.110	-0.026	-0.009	0.305	-0.356

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
190	0.938	0.936	0.605	0.605	0.616	0.373	0.462	0.335	0.970	0.948	-0.0009	0.0055	0.0122	0.0718	0.0008
191	0.811	0.809	0.541	0.540	0.577	0.392	0.377	0.280	0.964	0.970	-0.0009	0.0055	0.0096	0.0534	0.0010
192	0.534	0.555	0.412	0.435	0.465	0.395	0.271	0.236	0.934	0.940	-0.0009	0.0055	0.0046	0.0146	0.0007
193	0.959	0.958	0.613	0.614	0.643	0.402	0.469	0.331	0.958	0.950	-0.0009	0.0055	0.0134	0.0690	0.0009
194	1.409	1.412	0.816	0.819	1.077	0.714	0.626	0.400	0.944	0.956	-0.0009	0.0055	0.0261	0.1636	0.0009
195	2.818	2.811	1.799	1.834	1.850	1.190	1.389	0.921	0.782	0.740	-0.0009	0.0055	0.0218	0.1462	0.0010
196	1.593	1.658	1.208	1.301	1.391	1.191	0.807	0.676	0.690	0.676	-0.0009	0.0055	0.0082	0.0282	0.0007

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=10 RHO=0

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
197	0.5	0.01	0.0	1	0.167	0.168	0.585	0.586	0.074	0.075	0.079	0.079	-0.006	-0.013	-0.032	-0.040
198	0.5	0.01	0.4	1	0.280	0.281	0.514	0.515	0.170	0.170	0.071	0.071	-0.005	-0.025	-0.026	-0.046
199	0.5	0.01	0.8	1	0.404	0.405	0.331	0.331	0.288	0.288	0.045	0.045	-0.001	-0.046	-0.010	-0.055
200	0.5	0.05	0.0	1	0.207	0.209	0.596	0.596	0.062	0.063	0.080	0.080	-0.006	-0.011	-0.033	-0.039
201	0.5	0.20	0.0	1	0.507	0.508	0.743	0.744	0.040	0.040	0.096	0.097	-0.004	-0.003	-0.045	-0.045
202	1.5	0.01	0.0	1	0.494	0.502	1.754	1.756	0.225	0.231	0.236	0.237	-0.018	-0.041	-0.063	-0.181
203	1.5	0.01	0.8	1	1.210	1.212	0.991	0.992	0.867	0.867	0.136	0.136	-0.004	-0.139	-0.022	-0.188

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
197	0.171	0.180	0.174	0.183	0.167	0.168	0.074	0.075	0.434	0.442	0.006	0.161	0.0275	0.0735	0.0091
198	0.153	0.202	0.155	0.204	0.280	0.281	0.170	0.170	0.454	0.418	0.006	0.161	0.0213	0.0649	0.0056
199	0.099	0.251	0.100	0.252	0.404	0.405	0.288	0.288	0.468	0.394	0.006	0.161	0.0090	0.0234	0.0023
200	0.174	0.184	0.177	0.187	0.207	0.209	0.062	0.063	0.442	0.456	0.006	0.161	0.0284	0.0844	0.0109
201	0.210	0.231	0.214	0.233	0.507	0.508	0.040	0.040	0.458	0.446	0.006	0.161	0.0444	0.1726	0.0147
202	0.512	0.539	0.499	0.581	0.494	0.502	0.225	0.231	0.510	0.414	0.006	0.161	0.0506	0.2314	0.0173
203	0.297	0.754	0.295	0.771	1.210	1.212	0.867	0.867	0.498	0.386	0.006	0.161	0.0196	0.7233	0.0031

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=10 RHO=0.249

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	B'IAS_B2R
204	0.5	0.01	0.0	1.0661	0.167	0.167	0.588	0.588	0.074	0.076	0.078	0.078	-0.011	-0.017	-0.032	-0.038
205	0.5	0.01	0.4	1.0661	0.282	0.282	0.517	0.517	0.165	0.166	0.069	0.070	-0.004	-0.014	-0.020	-0.030
206	0.5	0.01	0.8	1.0661	0.420	0.420	0.331	0.331	0.276	0.276	0.046	0.046	0.002	-0.011	-0.005	-0.018
207	0.5	0.05	0.0	1.0661	0.207	0.207	0.597	0.597	0.063	0.064	0.078	0.079	-0.011	-0.016	-0.032	-0.039
208	0.5	0.20	0.0	1.0661	0.506	0.507	0.739	0.740	0.041	0.042	0.094	0.094	-0.011	-0.016	-0.043	-0.050
209	1.5	0.01	0.0	1.0661	0.495	0.499	1.762	1.765	0.224	0.233	0.234	0.235	-0.033	-0.050	-0.046	-0.187
210	1.5	0.01	0.8	1.0661	1.257	1.258	0.991	0.991	0.831	0.832	0.139	0.139	0.005	-0.033	-0.001	-0.079

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
204	0.169	0.187	0.168	0.187	0.170	0.170	0.076	0.076	0.472	0.438	0.003	0.146	0.0276	0.0777	0.0094
205	0.147	0.220	0.147	0.219	0.284	0.283	0.165	0.165	0.468	0.480	0.003	0.146	0.0212	0.0840	0.0098
206	0.092	0.261	0.092	0.260	0.421	0.421	0.276	0.276	0.476	0.464	0.003	0.146	0.0086	0.0294	0.0029
207	0.171	0.189	0.170	0.189	0.210	0.209	0.065	0.065	0.450	0.436	0.003	0.146	0.0284	0.0729	0.0095
208	0.214	0.228	0.212	0.227	0.508	0.508	0.043	0.042	0.460	0.414	0.003	0.146	0.0437	0.2333	0.0157
209	0.507	0.561	0.479	0.597	0.505	0.507	0.229	0.235	0.748	0.418	0.003	0.146	0.0510	0.1665	0.0169
210	0.275	0.784	0.270	0.792	1.260	1.261	0.831	0.831	0.660	0.460	0.003	0.146	0.0173	0.1694	0.0042

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

--- NB=40 NY=10 RHO=0.5 ---

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
211	0.5	0.01	0.0	1.33333	0.161	0.161	0.583	0.583	0.074	0.075	0.078	0.078	0.001	-0.032	-0.017	-0.049
212	0.5	0.01	0.4	1.33333	0.285	0.285	0.512	0.512	0.166	0.166	0.072	0.072	-0.005	-0.033	-0.019	-0.046
213	0.5	0.01	0.8	1.33333	0.414	0.414	0.331	0.331	0.295	0.295	0.048	0.048	-0.002	-0.041	-0.008	-0.046
214	0.5	0.05	0.0	1.33333	0.203	0.203	0.594	0.595	0.063	0.064	0.080	0.080	0.001	-0.032	-0.017	-0.050
215	0.5	0.20	0.0	1.33333	0.507	0.506	0.744	0.745	0.045	0.044	0.097	0.097	0.003	-0.035	-0.025	-0.062
216	1.5	0.01	0.0	1.33333	0.478	0.482	1.747	1.749	0.225	0.231	0.235	0.236	0.002	-0.095	0.025	-0.243
217	1.5	0.01	0.8	1.33333	1.238	1.239	0.992	0.992	0.887	0.887	0.145	0.145	-0.007	-0.122	0.001	-0.174

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
211	0.194	0.193	0.188	0.189	0.175	0.172	0.083	0.081	0.566	0.502	0.004	0.12	0.0270	0.0744	0.0096
212	0.174	0.218	0.170	0.216	0.293	0.292	0.165	0.165	0.514	0.464	0.004	0.12	0.0211	0.0537	0.0052
213	0.111	0.266	0.110	0.265	0.418	0.417	0.293	0.293	0.504	0.472	0.004	0.12	0.0090	0.0289	0.0023
214	0.198	0.200	0.191	0.196	0.216	0.213	0.074	0.071	0.560	0.498	0.004	0.12	0.0280	0.0804	0.0099
215	0.253	0.257	0.240	0.248	0.517	0.514	0.059	0.054	0.566	0.522	0.004	0.12	0.0438	0.1247	0.0145
216	0.582	0.578	0.538	0.611	0.520	0.517	0.252	0.250	0.742	0.416	0.004	0.12	0.0499	0.2751	0.0140
217	0.334	0.798	0.325	0.810	1.250	1.250	0.881	0.882	0.668	0.404	0.004	0.12	0.0183	0.0713	0.0031

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=10 RHO=0.75

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
218	0.5	0.01	0.0	2.28571	0.163	0.160	0.579	0.579	0.073	0.073	0.081	0.081	0.001	-0.025	-0.013	-0.040
219	0.5	0.01	0.4	2.28571	0.285	0.283	0.517	0.517	0.178	0.178	0.076	0.076	-0.002	-0.021	-0.013	-0.033
220	0.5	0.01	0.8	2.28571	0.406	0.406	0.332	0.332	0.290	0.290	0.049	0.050	0.002	-0.018	-0.004	-0.023
221	0.5	0.05	0.0	2.28571	0.204	0.202	0.591	0.591	0.062	0.062	0.082	0.082	0.000	-0.024	-0.014	-0.040
222	0.5	0.20	0.0	2.28571	0.505	0.503	0.742	0.742	0.040	0.040	0.098	0.098	-0.001	-0.023	-0.022	-0.047
223	1.5	0.01	0.0	2.28571	0.484	0.478	1.736	1.738	0.222	0.223	0.242	0.243	0.003	-0.075	0.092	-0.267
224	1.5	0.01	0.8	2.28571	1.213	1.214	0.995	0.996	0.871	0.872	0.148	0.148	0.006	-0.055	0.042	-0.128

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
218	0.257	0.253	0.237	0.234	0.210	0.199	0.107	0.099	0.736	0.686	-0.005	0.078	0.0257	0.0991	0.0096
219	0.227	0.266	0.213	0.252	0.315	0.308	0.179	0.177	0.726	0.700	-0.005	0.078	0.0207	0.0616	0.0075
220	0.142	0.274	0.138	0.269	0.418	0.417	0.284	0.284	0.654	0.696	-0.005	0.078	0.0087	0.0212	0.0025
221	0.257	0.255	0.237	0.236	0.245	0.234	0.096	0.087	0.722	0.696	-0.005	0.078	0.0267	0.0978	0.0101
222	0.309	0.314	0.274	0.281	0.534	0.523	0.075	0.062	0.766	0.740	-0.005	0.078	0.0416	0.1669	0.0127
223	0.771	0.759	0.685	0.748	0.625	0.599	0.325	0.297	0.650	0.418	-0.005	0.078	0.0475	0.2893	0.0128
224	0.425	0.824	0.407	0.826	1.251	1.249	0.853	0.854	0.548	0.458	-0.005	0.078	0.0172	0.0970	0.0034

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=10 RHO=0.9

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
225	0.5	0.01	0.0	5.26316	0.174	0.168	0.585	0.585	0.075	0.075	0.083	0.083	-0.008	-0.031	-0.019	-0.046
226	0.5	0.01	0.4	5.26316	0.280	0.276	0.517	0.518	0.160	0.161	0.073	0.073	-0.004	-0.019	-0.014	-0.029
227	0.5	0.01	0.8	5.26316	0.406	0.406	0.330	0.330	0.286	0.286	0.046	0.046	-0.002	-0.008	-0.007	-0.012
228	0.5	0.05	0.0	5.26316	0.213	0.208	0.597	0.597	0.064	0.064	0.085	0.085	-0.010	-0.027	-0.020	-0.043
229	0.5	0.20	0.0	5.26316	0.509	0.504	0.746	0.747	0.041	0.040	0.104	0.104	-0.019	-0.012	-0.030	-0.040
230	1.5	0.01	0.0	5.26316	0.518	0.500	1.753	1.756	0.228	0.230	0.249	0.250	-0.023	-0.094	0.173	-0.392
231	1.5	0.01	0.8	5.26316	1.215	1.214	0.987	0.988	0.861	0.861	0.138	0.138	-0.005	-0.027	0.093	-0.157

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
225	0.401	0.400	0.338	0.338	0.302	0.262	0.174	0.146	0.882	0.858	-0.0068	0.035	0.0255	0.0656	0.0058
226	0.335	0.361	0.248	0.315	0.363	0.339	0.178	0.169	0.880	0.860	-0.0068	0.035	0.0201	0.0489	0.0060
227	0.213	0.315	0.198	0.299	0.441	0.435	0.275	0.276	0.806	0.838	-0.0068	0.035	0.0085	0.0225	0.0029
228	0.410	0.407	0.344	0.343	0.333	0.294	0.167	0.138	0.896	0.872	-0.0068	0.035	0.0264	0.0672	0.0063
229	0.510	0.501	0.406	0.399	0.612	0.567	0.156	0.120	0.896	0.870	-0.0068	0.035	0.0394	0.1364	0.0061
230	1.203	1.198	0.966	1.057	0.901	0.791	0.523	0.424	0.712	0.558	-0.0068	0.035	0.0474	0.1800	0.0086
231	0.637	0.941	0.585	0.920	1.320	1.307	0.828	0.827	0.570	0.488	-0.0068	0.035	0.0168	0.0813	0.0038

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=10 RHO=0.95

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
232	0.5	0.01	0.0	10.2564	0.161	0.151	0.584	0.585	0.070	0.070	0.078	0.078	0.010	-0.045	-0.007	-0.051
233	0.5	0.01	0.4	10.2564	0.286	0.280	0.511	0.512	0.176	0.178	0.074	0.074	-0.007	-0.013	-0.016	-0.022
234	0.5	0.01	0.8	10.2564	0.427	0.425	0.330	0.330	0.291	0.291	0.046	0.046	-0.009	-0.006	-0.013	-0.009
235	0.5	0.05	0.0	10.2564	0.202	0.194	0.594	0.595	0.059	0.058	0.080	0.080	0.013	-0.047	-0.004	-0.053
236	0.5	0.20	0.0	10.2564	0.504	0.498	0.739	0.740	0.039	0.036	0.099	0.099	0.025	-0.056	0.001	-0.067
237	1.5	0.01	0.0	10.2564	0.479	0.451	1.752	1.756	0.212	0.212	0.233	0.234	0.030	-0.133	0.290	-0.477
238	1.5	0.01	0.8	10.2564	1.275	1.272	0.989	0.990	0.874	0.876	0.139	0.139	-0.027	-0.017	0.136	-0.209

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
232	0.525	0.529	0.399	0.403	0.373	0.290	0.241	0.189	0.922	0.914	-0.001	0.018	0.0229	0.0712	0.0045
233	0.467	0.495	0.369	0.398	0.437	0.382	0.232	0.207	0.904	0.914	-0.001	0.018	0.0180	0.0702	0.0032
234	0.316	0.411	0.278	0.371	0.497	0.480	0.287	0.284	0.854	0.878	-0.001	0.018	0.0080	0.0235	0.0018
235	0.535	0.536	0.406	0.408	0.402	0.321	0.235	0.180	0.924	0.908	-0.001	0.018	0.0236	0.0765	0.0047
236	0.668	0.662	0.479	0.476	0.682	0.592	0.235	0.167	0.932	0.902	-0.001	0.018	0.0345	0.0952	0.0058
237	1.573	1.586	1.168	1.262	1.170	0.910	0.724	0.513	0.680	0.590	-0.001	0.018	0.0432	0.1749	0.0039
238	0.946	1.228	0.812	1.122	1.488	1.439	0.861	0.850	0.642	0.566	-0.001	0.018	0.0156	0.0969	0.0019

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=10 RHO=0.989

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
239	0.5	0.01	0.0	45.7059	0.162	0.143	0.586	0.588	0.074	0.072	0.079	0.079	-0.080	0.063	-0.042	0.009
240	0.5	0.01	0.4	45.7059	0.293	0.283	0.517	0.518	0.177	0.181	0.070	0.070	-0.010	-0.013	-0.012	-0.025
241	0.5	0.01	0.8	45.7059	0.445	0.443	0.331	0.331	0.300	0.301	0.044	0.045	0.008	-0.046	-0.003	-0.041
242	0.5	0.05	0.0	45.7059	0.204	0.189	0.596	0.598	0.061	0.059	0.080	0.080	-0.072	0.055	-0.039	0.005
243	0.5	0.20	0.0	45.7059	0.507	0.497	0.738	0.740	0.040	0.036	0.099	0.099	-0.043	0.025	-0.022	-0.019
244	1.5	0.01	0.0	45.7059	0.479	0.422	1.759	1.764	0.225	0.217	0.236	0.236	-0.243	0.194	0.310	-0.414
245	1.5	0.01	0.8	45.7059	1.332	1.324	0.989	0.992	0.901	0.906	0.133	0.133	0.019	-0.133	0.340	-0.479

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
239	1.181	1.170	0.741	0.730	0.779	0.441	0.573	0.424	0.970	0.956	-0.0002	0.004	0.0169	0.0653	0.0016
240	1.044	1.027	0.674	0.656	0.757	0.508	-0.487	0.364	0.938	0.952	-0.0002	0.004	0.0142	0.0585	0.0009
241	0.671	0.700	0.488	0.514	0.668	0.569	0.358	0.324	0.906	0.924	-0.0002	0.004	0.0070	0.0265	0.0008
242	1.201	1.190	0.753	0.742	0.809	0.471	0.570	0.420	0.960	0.956	-0.0002	0.004	0.0172	0.0652	0.0015
243	1.511	1.498	0.944	0.931	1.134	0.761	0.672	0.485	0.966	0.962	-0.0002	0.004	0.0235	0.0991	0.0007
244	3.542	3.511	2.194	2.193	2.332	1.388	1.724	1.180	0.816	0.782	-0.0002	0.004	0.0289	0.1737	0.0019
245	2.008	2.097	1.433	1.564	2.003	1.728	1.069	0.926	0.742	0.704	-0.0002	0.004	0.0137	0.1115	0.0008

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=25 RHO=0

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
246	0.5	0.01	0.0	1	0.099	0.100	0.364	0.364	0.041	0.042	0.050	0.050	-0.006	-0.008	-0.017	-0.018
247	0.5	0.01	0.4	1	0.185	0.186	0.318	0.318	0.107	0.107	0.043	0.043	-0.008	-0.005	-0.015	-0.013
248	0.5	0.01	0.8	1	0.267	0.267	0.205	0.205	0.195	0.195	0.028	0.028	-0.004	-0.004	-0.007	-0.007
249	0.5	0.05	0.0	1	0.157	0.157	0.381	0.381	0.031	0.031	0.052	0.052	-0.007	-0.007	-0.018	-0.018
250	0.5	0.20	0.0	1	0.487	0.487	0.585	0.586	0.025	0.025	0.074	0.074	-0.008	-0.002	-0.034	-0.029
251	1.5	0.01	0.0	1	0.287	0.290	1.089	1.089	0.127	0.130	0.148	0.148	-0.019	-0.024	-0.037	-0.079
252	1.5	0.01	0.8	1	0.797	0.797	0.613	0.613	0.588	0.583	0.086	0.086	-0.011	-0.012	-0.017	-0.030

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
246	0.103	0.106	0.104	0.107	0.099	0.100	0.041	0.042	0.460	0.436	0.002	0.16	0.0103	0.0266	0.0041
247	0.092	0.132	0.093	0.133	0.185	0.186-	0.107	0.107	0.454	0.470	0.002	0.16	0.0079	0.0198	0.0028
248	0.057	0.170	0.058	0.170	0.267	0.267	0.195	0.195	0.460	0.474	0.002	0.16	0.0033	0.0076	0.0011
249	0.108	0.113	0.109	0.114	0.157	0.157	0.031	0.031	0.456	0.436	0.002	0.16	0.0113	0.0289	0.0045
250	0.164	0.173	0.168	0.175	0.487	0.487	0.025	0.025	0.442	0.440	0.002	0.16	0.0270	0.0763	0.0090
251	0.306	0.316	0.304	0.329	0.287	0.290	0.127	0.130	0.518	0.428	0.002	0.16	0.0184	0.0564	0.0057
252	0.171	0.510	0.170	0.513	0.797	0.797	0.588	0.588	0.482	0.464	0.002	0.16	0.0060	0.0180	0.0016

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=25 RHO=0.249

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
253	0.5	0.01	0.0	1.0661	0.101	0.102	0.359	0.359	0.043	0.043	0.048	0.048	-0.001	-0.011	-0.009	-0.019
254	0.5	0.01	0.4	1.0661	0.176	0.176	0.318	0.318	0.103	0.103	0.044	0.044	-0.001	-0.012	-0.007	-0.019
255	0.5	0.01	0.8	1.0661	0.253	0.253	0.206	0.206	0.170	0.170	0.028	0.028	-0.001	-0.012	-0.003	-0.015
256	0.5	0.05	0.0	1.0661	0.158	0.159	0.377	0.377	0.033	0.033	0.049	0.049	-0.002	-0.010	-0.010	-0.019
257	0.5	0.20	0.0	1.0661	0.489	0.489	0.582	0.582	0.025	0.026	0.072	0.072	-0.005	-0.007	-0.025	-0.028
258	1.5	0.01	0.0	1.0661	0.294	0.296	1.075	1.075	0.132	0.134	0.144	0.144	-0.002	-0.033	-0.006	-0.086
259	1.5	0.01	0.8	1.0661	0.752	0.753	0.615	0.615	0.514	0.514	0.084	0.084	-0.001	-0.037	-0.003	-0.055

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
253	0.107	0.111	0.106	0.111	0.103	0.103	0.044	0.044	0.480	0.458	0.004	0.155	0.0100	0.0231	0.0032
254	0.091	0.129	0.091	0.129	0.177	0.177	0.103	0.103	0.470	0.428	0.004	0.155	0.0079	0.0209	0.0028
255	0.059	0.157	0.059	0.157	0.253	0.253	0.170	0.170	0.470	0.466	0.004	0.155	0.0033	0.0086	0.0011
256	0.114	0.117	0.114	0.118	0.160	0.160	0.034	0.034	0.470	0.446	0.004	0.155	0.0110	0.0284	0.0034
257	0.180	0.182	0.179	0.181	0.491	0.490	0.027	0.026	0.494	0.458	0.004	0.155	0.0265	0.0828	0.0096
258	0.318	0.332	0.311	0.344	0.300	0.302	0.136	0.137	0.704	0.430	0.004	0.155	0.0180	0.0469	0.0055
259	0.174	0.472	0.173	0.475	0.754	0.755	0.513	0.513	0.626	0.458	0.004	0.155	0.0061	0.0192	0.0017

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=25 RHO=0.5

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_H2R
260	0.5	0.01	0.0	1.33333	0.101	0.102	0.364	0.364	0.044	0.044	0.049	0.049	-0.009	-0.004	-0.015	-0.011
261	0.5	0.01	0.4	1.33333	0.180	0.180	0.323	0.323	0.107	0.107	0.046	0.046	-0.007	-0.006	-0.012	-0.011
262	0.5	0.01	0.8	1.33333	0.256	0.256	0.208	0.208	0.181	0.181	0.029	0.029	-0.001	-0.010	-0.004	-0.012
263	0.5	0.05	0.0	1.33333	0.157	0.157	0.380	0.380	0.032	0.032	0.050	0.050	-0.008	-0.006	-0.016	-0.014
264	0.5	0.20	0.0	1.33333	0.485	0.486	0.578	0.579	0.023	0.023	0.070	0.070	-0.008	-0.014	-0.024	-0.031
265	1.5	0.01	0.0	1.33333	0.295	0.297	1.089	1.089	0.134	0.136	0.146	0.147	-0.026	-0.012	-0.014	-0.073
266	1.5	0.01	0.8	1.33333	0.762	0.762	0.621	0.621	0.546	0.546	0.087	0.087	-0.004	-0.030	0.000	-0.050

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
260	0.115	0.121	0.114	0.120	0.108	0.108	0.047	0.046	0.466	0.484	-0.005	0.123	0.0103	0.0218	0.0041
261	0.100	0.141	0.099	0.140	0.184	0.184	0.107	0.107	0.476	0.464	-0.005	0.123	0.0081	0.0191	0.0026
262	0.063	0.163	0.063	0.163	0.258	0.258	0.180	0.180	0.482	0.456	-0.005	0.123	0.0034	0.0082	0.0011
263	0.119	0.124	0.118	0.123	0.162	0.161	0.035	0.035	0.472	0.476	-0.005	0.123	0.0113	0.0255	0.0045
264	0.183	0.185	0.179	0.182	0.490	0.489	0.028	0.026	0.498	0.470	-0.005	0.123	0.0263	0.0769	0.0090
265	0.345	0.362	0.335	0.370	0.317	0.316	0.144	0.144	0.668	0.452	-0.005	0.123	0.0184	0.0430	0.0057
266	0.190	0.488	0.188	0.491	0.768	0.769	0.544	0.544	0.588	0.452	-0.005	0.123	0.0062	0.0228	0.0017

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=25 RHO=0.75

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
267	0.5	0.01	0.0	2.28571	0.098	0.097	0.361	0.361	0.042	0.042	0.053	0.053	-0.003	-0.017	-0.008	-0.023
268	0.5	0.01	0.4	2.28571	0.178	0.178	0.320	0.320	0.106	0.106	0.045	0.045	-0.001	-0.023	-0.006	-0.028
269	0.5	0.01	0.8	2.28571	0.257	0.257	0.207	0.207	0.178	0.178	0.028	0.028	0.002	-0.017	0.000	-0.019
270	0.5	0.05	0.0	2.28571	0.155	0.155	0.377	0.378	0.031	0.031	0.054	0.054	-0.004	-0.016	-0.010	-0.023
271	0.5	0.20	0.0	2.28571	0.486	0.485	0.580	0.580	0.024	0.024	0.071	0.071	-0.008	-0.014	-0.021	-0.029
272	1.5	0.01	0.0	2.28571	0.284	0.285	1.082	1.082	0.130	0.131	0.160	0.161	-0.008	-0.052	0.038	-0.140
273	1.5	0.01	0.8	2.28571	0.764	0.765	0.620	0.620	0.537	0.537	0.083	0.083	0.006	-0.051	0.023	-0.082

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
267	0.150	0.156	0.145	0.151	0.126	0.123	0.064	0.062	0.652	0.572	-0.006	0.074	0.0102	0.0275	0.0038
268	0.137	0.170	0.133	0.167	0.197	0.196	0.107	0.107	0.652	0.622	-0.006	0.074	0.0080	0.0187	0.0028
269	0.088	0.173	0.087	0.172	0.264	0.264	0.175	0.175	0.592	0.586	-0.006	0.074	0.0034	0.0078	0.0014
270	0.158	0.164	0.153	0.159	0.178	0.176	0.054	0.051	0.630	0.608	-0.006	0.074	0.0111	0.0312	0.0042
271	0.250	0.253	0.232	0.235	0.508	0.503	0.051	0.045	0.746	0.696	-0.006	0.074	0.0257	0.0791	0.0084
272	0.447	0.466	0.425	0.473	0.370	0.366	0.195	0.190	0.542	0.390	-0.006	0.074	0.0186	0.0542	0.0054
273	0.263	0.517	0.259	0.521	0.788	0.788	0.527	0.528	0.502	0.444	-0.006	0.074	0.0063	0.0195	0.0022

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=25 RHO=0.9

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
274	0.5	0.01	0.0	5.26316	0.102	0.100	0.366	0.366	0.044	0.043	0.050	0.050	0.005	-0.009	0.001	-0.015
275	0.5	0.01	0.4	5.26316	0.173	0.172	0.320	0.320	0.104	0.104	0.045	0.045	0.006	-0.009	0.002	-0.013
276	0.5	0.01	0.8	5.26316	0.248	0.248	0.205	0.205	0.174	0.175	0.030	0.030	0.003	-0.007	0.001	-0.008
277	0.5	0.05	0.0	5.26316	0.158	0.156	0.383	0.383	0.033	0.032	0.050	0.050	0.006	-0.008	0.001	-0.014
278	0.5	0.20	0.0	5.26316	0.488	0.485	0.584	0.584	0.027	0.026	0.070	0.071	0.008	-0.004	-0.003	-0.018
279	1.5	0.01	0.0	5.26316	0.297	0.291	1.097	1.098	0.134	0.134	0.149	0.150	0.016	-0.026	0.142	-0.190
280	1.5	0.01	0.8	5.26316	0.739	0.739	0.611	0.611	0.527	0.527	0.089	0.089	0.009	-0.021	0.057	-0.081

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSE0_O	MTSE0_R	STSE0_O	STSE0_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
274	0.230	0.238	0.210	0.218	0.175	0.163	0.102	0.093	0.876	0.846	-0.002	0.0345	0.0101	0.0365	0.0026
275	0.212	0.236	0.197	0.222	0.229	0.221	0.116	0.113	0.864	0.852	-0.002	0.0345	0.0078	0.0215	0.0024
276	0.136	0.203	0.131	0.198	0.272	0.270	0.170	0.169	0.776	0.816	-0.002	0.0345	0.0033	0.0079	0.0012
277	0.242	0.248	0.220	0.226	0.220	0.209	0.094	0.084	0.884	0.882	-0.002	0.0345	0.0110	0.0375	0.0026
278	0.383	0.377	0.320	0.314	0.552	0.528	0.100	0.079	0.894	0.904	-0.002	0.0345	0.0242	0.0622	0.0050
279	0.687	0.713	0.627	0.677	0.519	0.491	0.307	0.282	0.538	0.464	-0.002	0.0345	0.0184	0.0747	0.0046
280	0.404	0.608	0.393	0.604	0.811	0.809	0.511	0.511	0.470	0.482	-0.002	0.0345	0.0060	0.0206	0.0017

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=25 RHO=0.95

EXP_NO	BETA_Z	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B1O	BIAS_B2O	BIAS_B1R	BIAS_B2R
281	0.5	0.01	0.0	10.2564	0.100	0.097	0.360	0.360	0.041	0.041	0.050	0.050	-0.013	-0.006	-0.015	-0.013
282	0.5	0.01	0.4	10.2564	0.165	0.163	0.319	0.319	0.100	0.100	0.045	0.045	-0.001	-0.010	-0.004	-0.015
283	0.5	0.01	0.8	10.2564	0.244	0.243	0.205	0.206	0.169	0.169	0.028	0.028	0.005	-0.002	0.004	-0.004
284	0.5	0.05	0.0	10.2564	0.157	0.154	0.379	0.379	0.031	0.030	0.071	0.051	-0.011	-0.009	-0.014	-0.017
285	0.5	0.20	0.0	10.2564	0.487	0.483	0.588	0.589	0.026	0.024	0.073	0.073	-0.005	-0.020	-0.014	-0.034
286	1.5	0.01	0.0	10.2564	0.291	0.281	1.078	1.080	0.128	0.127	0.149	0.150	-0.040	-0.016	0.163	-0.254
287	1.5	0.01	0.8	10.2564	0.725	0.724	0.613	0.613	0.509	0.509	0.085	0.085	0.014	-0.006	0.103	-0.108

EXP_NO	RMSE_B1O	RMSE_B2O	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
281	0.313	0.319	0.266	0.272	0.224	0.195	0.145	0.122	0.920	0.912	-0.003	0.019	0.0096	0.0282	0.0031
282	0.289	0.299	0.253	0.264	0.258	0.239	0.143	0.130	0.902	0.874	-0.003	0.019	0.0076	0.0193	0.0026
283	0.187	0.235	0.175	0.224	0.286	0.281	0.165	0.164	0.864	0.866	-0.003	0.019	0.0032	0.0081	0.0011
284	0.336	0.341	0.283	0.288	0.270	0.240	0.146	0.119	0.924	0.914	-0.003	0.019	0.0106	0.0279	0.0033
285	0.548	0.548	0.419	0.419	0.617	0.560	0.194	0.146	0.924	0.932	-0.003	0.019	0.0233	0.0745	0.0027
286	0.936	0.952	0.774	0.833	0.665	0.586	0.435	0.352	0.616	0.514	-0.003	0.019	0.0174	0.0658	0.0035
287	0.557	0.701	0.524	0.677	0.852	0.842	0.496	0.490	0.508	0.482	-0.003	0.019	0.0058	0.0167	0.0015

TABLE 1A. CONTINUED -- SUMMARY OF SIMULATION RESULTS

NB=40 NY=25 RHO=0.989

EXP_NO	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
288	0.5	0.01	0.0	45.7059	0.102	0.093	0.372	0.372	0.043	0.042	0.051	0.052	-0.065	0.051	-0.042	0.019
289	0.5	0.01	0.4	45.7059	0.181	0.176	0.322	0.322	0.113	0.114	0.044	0.044	-0.076	0.061	-0.057	0.035
290	0.5	0.01	0.8	45.7059	0.265	0.264	0.205	0.205	0.189	0.190	0.028	0.028	-0.050	0.032	-0.044	0.022
291	0.5	0.05	0.0	45.7059	0.157	0.151	0.387	0.388	0.031	0.030	0.053	0.053	-0.065	0.052	-0.043	0.021
292	0.5	0.20	0.0	45.7059	0.487	0.481	0.584	0.586	0.024	0.022	0.074	0.074	-0.064	0.055	-0.055	0.028
293	1.5	0.01	0.0	45.7059	0.297	0.269	1.113	1.116	0.134	0.131	0.154	0.155	-0.195	0.152	0.259	-0.331
294	1.5	0.01	0.8	45.7059	0.790	0.787	0.612	0.613	0.571	0.574	0.085	0.085	-0.151	0.094	0.131	-0.198

EXP_NO	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
288	0.708	0.709	0.484	0.484	0.477	0.313	0.335	0.251	0.966	0.968	-0.0009	0.0046	0.0084	0.0255	0.0013
289	0.630	0.621	0.459	0.450	0.464	0.349	0.286	0.229	0.952	0.962	-0.0009	0.0046	0.0066	0.0216	0.0010
290	0.403	0.405	0.333	0.335	0.399	0.361	0.213	0.199	0.922	0.914	-0.0009	0.0046	0.0030	0.0087	0.0008
291	0.743	0.746	0.499	0.501	0.528	0.355	0.330	0.242	0.970	0.962	-0.0009	0.0046	0.0090	0.0344	0.0012
292	1.159	1.167	0.733	0.743	0.936	0.683	0.494	0.338	0.960	0.936	-0.0009	0.0046	0.0173	0.0653	0.0012
293	2.120	2.123	1.415	1.445	1.421	0.955	1.011	0.701	0.764	0.740	-0.0009	0.0046	0.0147	0.0587	0.0014
294	1.203	1.210	0.971	1.012	1.194	1.082	0.633	0.584	0.658	0.628	-0.0009	0.0046	0.0054	0.0214	0.0007

Table 2A.--Summary of sensitivity analysis results.

Explanation

Because this table was printed on a line printer without lower case or Greek letters, the following notation changes were made:

Text notation	Equivalent table notation
ρ	*RHO*
N	*NB*
n	*NY*
ρ_c	*RHO_C*
$\sigma(\zeta_j)$	*SD_ZETA*
β_2	*BETA_2*

In all experiments,

$$\sigma(\eta_j) = \sigma(\zeta_j)$$

$$\beta_0 = 0$$

$$\beta_1 = 1.$$

TABLE 2A -- SUMMARY OF SENSITIVITY ANALYSIS RESULTS 1

NB=15 NY=10 RHO=0

REPS	BETA_2	SO_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B1O	BIAS_B2O	BIAS_B1R	BIAS_B2R	RMSE_B1O
100	0.5	0.01	0.0	1	0.269	0.267	0.565	0.568	0.129	0.125	0.139	0.141	0.077	-0.009	0.006	-0.077	0.309
500	0.5	0.01	0.0	1	0.268	0.276	0.569	0.573	0.124	0.129	0.137	0.141	-0.003	-0.026	-0.077	-0.101	0.291
1000	0.5	0.01	0.0	1	0.273	0.279	0.579	0.583	0.127	0.131	0.135	0.137	0.015	-0.040	-0.062	-0.115	0.292
2000	0.5	0.01	0.0	1	0.273	0.278	0.573	0.576	0.135	0.138	0.136	0.139	-0.002	-0.028	-0.073	-0.099	0.305
3000	0.5	0.01	0.0	1	0.273	0.280	0.577	0.581	0.129	0.133	0.138	0.140	-0.016	-0.026	-0.089	-0.100	0.295
4000	0.5	0.01	0.0	1	0.275	0.282	0.578	0.582	0.129	0.135	0.140	0.142	0.002	-0.031	-0.073	-0.106	0.297
5000	0.5	0.01	0.0	1	0.275	0.280	0.580	0.584	0.131	0.136	0.137	0.139	0.004	-0.024	-0.072	-0.100	0.300
100	0.5	0.01	0.8	1	0.503	0.503	0.320	0.321	0.347	0.347	0.081	0.082	0.031	0.034	0.007	0.009	0.159
500	0.5	0.01	0.8	1	0.440	0.441	0.331	0.332	0.297	0.296	0.079	0.079	-0.006	-0.011	-0.032	-0.036	0.170
1000	0.5	0.01	0.8	1	0.441	0.442	0.323	0.324	0.297	0.296	0.078	0.078	0.003	-0.026	-0.023	-0.051	0.164
2000	0.5	0.01	0.8	1	0.449	0.450	0.323	0.324	0.295	0.295	0.078	0.079	-0.002	-0.037	-0.029	-0.062	0.169
3000	0.5	0.01	0.8	1	0.442	0.442	0.328	0.329	0.284	0.284	0.079	0.080	0.004	-0.022	-0.023	-0.048	0.168
4000	0.5	0.01	0.8	1	0.438	0.440	0.325	0.326	0.287	0.287	0.077	0.078	0.001	-0.034	-0.026	-0.060	0.165
5000	0.5	0.01	0.8	1	0.442	0.444	0.326	0.325	0.282	0.282	0.077	0.078	-0.003	-0.033	-0.029	-0.059	0.167

REPS	RMSE_B2O	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
100	0.308	0.295	0.310	0.269	0.267	0.129	0.125	0.550000	0.430000	-0.031	0.275	0.0710	0.2345	0.0113
500	0.303	0.302	0.319	0.268	0.276	0.124	0.129	0.444000	0.426000	-0.001	0.273	0.0845	0.4178	0.0091
1000	0.306	0.298	0.323	0.273	0.279	0.127	0.131	0.469000	0.410000	-0.005	0.263	0.0866	0.9627	0.0109
2000	0.304	0.312	0.315	0.273	0.278	0.135	0.138	0.468000	0.437500	0.008	0.266	0.0862	1.0000	0.0069
3000	0.304	0.306	0.316	0.273	0.280	0.129	0.133	0.449667	0.429667	0.013	0.264	0.0868	1.0000	0.0023
4000	0.301	0.306	0.320	0.275	0.282	0.129	0.135	0.461250	0.413750	-0.002	0.268	0.0886	1.0000	0.0055
5000	0.304	0.307	0.318	0.275	0.280	0.131	0.136	0.461200	0.423600	-0.005	0.265	0.0872	1.0000	0.0087
100	0.322	0.156	0.320	0.503	0.503	0.347	0.347	0.590000	0.540000	-0.007	0.272	0.0223	0.1065	0.0049
500	0.304	0.172	0.304	0.440	0.441	0.297	0.296	0.478000	0.464000	0.015	0.264	0.0261	0.1043	0.0031
1000	0.301	0.166	0.304	0.441	0.442	0.297	0.296	0.483000	0.439000	-0.002	0.268	0.0257	0.1349	0.0020
2000	0.300	0.172	0.303	0.449	0.450	0.295	0.295	0.459000	0.434500	0.003	0.265	0.0261	0.2091	0.0033
3000	0.297	0.171	0.298	0.442	0.442	0.284	0.284	0.480667	0.462000	-0.001	0.269	0.0264	0.4740	0.0025
4000	0.293	0.169	0.297	0.438	0.440	0.287	0.287	0.471750	0.434750	-0.001	0.268	0.0264	0.2056	0.0021
5000	0.297	0.170	0.300	0.442	0.444	0.282	0.282	0.469400	0.427200	-0.005	0.266	0.0265	0.2291	0.0025

TABLE 2A -- SUMMARY OF SENSITIVITY ANALYSIS RESULTS

NB=15 NY=10 RHO=0.95

REPS	BETA_2	SD_ZETA	RHO_C	VIF	MTSE_OLS	MTSE_RGE	MOSE_OLS	MOSE_RGE	STSE_OLS	STSE_RGE	SOSE_OLS	SOSE_RGE	BIAS_B10	BIAS_B20	BIAS_B1R	BIAS_B2R
100	0.5	0.01	0.0	10.2564	0.257	0.223	0.583	0.587	0.130	0.121	0.151	0.153	-0.004	-0.029	-0.028	-0.062
500	0.5	0.01	0.0	10.2564	0.270	0.243	0.569	0.574	0.127	0.121	0.141	0.142	-0.011	-0.014	-0.046	-0.033
1000	0.5	0.01	0.0	10.2564	0.283	0.253	0.582	0.587	0.140	0.134	0.142	0.144	-0.051	0.011	-0.060	-0.035
2000	0.5	0.01	0.0	10.2564	0.276	0.246	0.579	0.583	0.132	0.127	0.142	0.143	0.008	-0.044	-0.031	-0.058
3000	0.5	0.01	0.0	10.2564	0.276	0.244	0.584	0.589	0.135	0.129	0.141	0.143	0.010	-0.028	-0.017	-0.055
4000	0.5	0.01	0.0	10.2564	0.275	0.243	0.580	0.585	0.132	0.123	0.139	0.141	-0.005	-0.013	-0.026	-0.046
5000	0.5	0.01	0.0	10.2564	0.275	0.246	0.581	0.586	0.132	0.127	0.142	0.144	0.004	-0.036	-0.029	-0.059
100	0.5	0.01	0.8	10.2564	0.448	0.442	0.320	0.321	0.303	0.306	0.084	0.085	0.033	-0.033	0.027	-0.049
500	0.5	0.01	0.8	10.2564	0.437	0.430	0.324	0.326	0.295	0.298	0.077	0.077	-0.005	-0.026	-0.017	-0.035
1000	0.5	0.01	0.8	10.2564	0.430	0.424	0.326	0.327	0.275	0.278	0.078	0.079	0.002	-0.038	-0.015	-0.043
2000	0.5	0.01	0.8	10.2564	0.438	0.431	0.327	0.329	0.287	0.290	0.078	0.079	0.007	-0.037	-0.006	-0.045
3000	0.5	0.01	0.8	10.2564	0.442	0.435	0.327	0.328	0.280	0.283	0.081	0.082	0.005	-0.029	-0.008	-0.037
4000	0.5	0.01	0.8	10.2564	0.444	0.437	0.327	0.328	0.286	0.289	0.078	0.079	0.000	-0.030	-0.014	-0.038
5000	0.5	0.01	0.8	10.2564	0.439	0.433	0.325	0.327	0.290	0.292	0.079	0.079	0.004	-0.034	-0.010	-0.042

REPS	RMSE_B10	RMSE_B20	RMSE_B1R	RMSE_B2R	MTSEO_O	MTSEO_R	STSEO_O	STSEO_R	P_RGE1	P_RGE2	BIAS_RHO	RMSE_RHO	K_MEAN	K_MAX	K_MIN
100	0.945	0.905	0.596	0.579	0.640	0.399	0.442	0.318	0.930000	0.890000	-0.005	0.043	0.0588	0.3392	0.0040
500	0.925	0.943	0.604	0.623	0.643	0.427	0.447	0.314	0.918000	0.900000	-0.006	0.034	0.0570	0.3578	0.0034
1000	1.042	1.040	0.703	0.701	0.692	0.455	0.524	0.389	0.911000	0.898000	-0.005	0.037	0.0601	0.5749	0.0007
2000	0.984	1.003	0.659	0.678	0.668	0.444	0.495	0.364	0.910000	0.905000	-0.005	0.034	0.0584	0.4534	0.0019
3000	1.000	0.993	0.664	0.659	0.673	0.442	0.491	0.356	0.918667	0.909667	-0.006	0.034	0.0576	0.5150	0.0018
4000	0.999	0.998	0.655	0.656	0.679	0.443	0.484	0.346	0.922500	0.920500	-0.005	0.034	0.0564	1.0000	0.0015
5000	0.970	0.976	0.638	0.645	0.662	0.433	0.475	0.344	0.909400	0.914000	-0.005	0.034	0.0583	0.4671	0.0008
100	0.504	0.557	0.391	0.449	0.583	0.526	0.324	0.310	0.880000	0.890000	-0.006	0.034	0.0222	0.0923	0.0036
500	0.540	0.589	0.409	0.460	0.593	0.524	0.319	0.302	0.890000	0.884000	-0.006	0.037	0.0224	0.1414	0.0016
1000	0.534	0.573	0.402	0.442	0.581	0.514	0.302	0.281	0.874000	0.887000	-0.005	0.035	0.0228	0.1375	0.0026
2000	0.557	0.609	0.418	0.472	0.597	0.527	0.325	0.300	0.894000	0.892500	-0.004	0.033	0.0222	0.2727	0.0020
3000	0.569	0.616	0.430	0.477	0.604	0.533	0.324	0.297	0.883333	0.892667	-0.004	0.033	0.0220	0.2202	0.0016
4000	0.556	0.606	0.417	0.470	0.602	0.531	0.321	0.297	0.887000	0.890250	-0.004	0.033	0.0221	0.1368	0.0008
5000	0.575	0.617	0.435	0.478	0.601	0.531	0.336	0.307	0.881000	0.893200	-0.005	0.034	0.0219	0.2139	0.0007

APPENDIX B -- COMPUTER PROGRAM LISTING FOR PROGRAM RIDGE TEST.

```
C     ----------------------------------------------------------------------
C     PROGRAM RIDGE TEST
C     HARRIS FORTRAN 77 FOR HARRIS MINI COMPUTER
C     PROGRAMMER G. D. TASKER, AUGUST 1979
C     ----------------------------------------------------------------------
      DIMENSION U(50), V(50), E(50), D(50), R2(50)
      DIMENSION Z(18), YHAT(50)
      DIMENSION X(50), Y(50), W(50)
      DIMENSION A(50), SL(50), P50(50)
      DIMENSION TRE(2), TRR(2), TIR(2)
      COMMON /ARMOD/ ABAR,SIGA,SBAR,SIGS,ASCOV,ALPHA1,ALPHA2
      COMMON /FLOW1/ YBAR(50),SDEV(50),AMU(50),SIGMA(50)
      INTEGER*6 IRAND
C
C     READ INPUT VARIABLES
C
C     A1=RANGE OF LOGS OF AREA
C     A0=MINIMUM AREA, IN LOG UNITS
C     S1=RANGE OF LOGS OF SLOPE
C     S0=MINIMUM SLOPE, IN LOG UNITS
C     A=LOG(AREA)
C     SL=LOG(SLOPE)
C     P2=LOG(2-YR PEAK)
C     P50=LOG(50-YR PEAK)
C     TRUE MODELS:
C     AMU=BETA1*A+ALPHA1
C     SIGMA=BETA2*SL+ALPHA2
C     P2=AMU
C     P50=AMU+SIGMA*AK50
C     NB=NUMBER OF BASINS
C     NY=NUMBER OF YEARS OF RECORD
C     ROCRS=CROSS CORRELATION BETWEEN SITES
C     RHO=CORRELATION BETWEEN AREA AND SLOPE
C     IREP=NO. OF REPLICATIONS TO ACCOUNT FOR SPACE SAMPLING ERRORS
C     NTIMES=NO. OF REPLICATIONS TO ACCOUNT FOR TIME SAMPLING ERRORS
C     IRAND=RANDOM NUMBER SEED
    1 READ (5,13,END=7) A1,A0,S1,S0,BETA1,BETA2,ALPHA1,ALPHA2,NB,NY,ROCR
     1S,IREP,NTIMES,IRAND,RHO
      RHOU=RHO-.02*SIN(3.1416*RHO)
      WRITE (6,14) A1,A0,S1,S0,BETA1,BETA2,ALPHA1,ALPHA2,NB,NY,ROCRS,NTI
     1MES,IREP,IRAND,RHOU
      WRITE (7,8) A1,A0,S1,S0,BETA1,BETA2,ALPHA1,ALPHA2,NB,NY,ROCRS,NTIM
     1ES,IREP,IRAND,RHOU
C
C     GENERATE RANDOM NUMBERS AND INITIALIZATION
C
      DO 2 I=1,100
    2 X(I)=GAUSSB(IRAND)
      CALL GAUSSV (IRAND,E,50)
      CALL GAUSSV (IRAND,D,50)
      TRESS=0.
      TRES=0.
      SUMSE=0.
      SUMSE2=0.
      KOUNT=0
      B21S=0.
      BR1S=0.
      B22S=0.
      BR2S=0.
      B21SS=0.
      BR1SS=0.
```

```
      B22SS=0.
      BR2SS=0.
      RASS=0.
      RASSS=0.
      BI1S=0.
      BI2S=0.
      BI1SS=0.
      BI2SS=0.
      RK1S=0.
      RK2S=0.
      RK1MAX=-999.
      RK2MAX=-999.
      RK2MIN=999.
      RK1MIN=999.
      TRRS=0.
      TRRSS=0.
      TIRS=0.
      TIRSS=0.
      TIRSS=0.
      SER1=0.
      SER2=0.
      SSER1=0.
      SSER2=0.
      TRET=0.
      TRRT=0.
      TIRT=0.
      TREST=0.
      TRRST=0.
      TIRST=0.
      KNT1=0
      KNT2=0
      KNTRK=0
      ABAR=A0+A1/2.
      SBAR=S0+S1/2.
      SIGA=SQRT(A1*A1/12.)
      SIGS=SQRT(S1*S1/12.)
      ASCOV=SIGA*SIGS*RHOU
C
      DO 6 I=1,IREP
      DO 3 KL=1,NB
      X(KL)=GAUSSB(IRAND)
      Y(KL)=GAUSSB(IRAND)
      W(KL)=RHO*Y(KL)+X(KL)*SQRT(1-RHO*RHO)
      U(KL)=GAUSCF(Y(KL))
      V(KL)=GAUSCF(W(KL))
    3 CONTINUE
      CALL GAUSSV (IRAND,E,NB)
      CALL GAUSSV (IRAND,D,NB)
C
C     CALCULATE TRUE STATISTICS
C
      DO 4 IA=1,NB
C
      A(IA)=U(IA)*A1+A0
      AMU(IA)=BETA1*A(IA)+ALPHA1*E(IA)
      SL(IA)=V(IA)*S1+S0
      SIGMA(IA)=BETA2*SL(IA)+ALPHA2*D(IA)
    4 CONTINUE
C
C     GENERATE SAMPLE FLOWS
C
```

```
      CALL FST (0.0,ROCRS,NY,NB)
      DO 6 IB=1,NTIMES
      CALL FLOW (IRAND)
      DO 5 IC=1,NB
      AK50=2.05375
      P50(IC)=YBAR(IC)+AK50*SDEV(IC)
    5 CONTINUE
C
C     CALCULATE REGRESSION PARAMETERS
C
      CALL RIDGE2 (A,SL,NB,P50,YHAT,R2,Z)
      B20=Z(3)-Z(4)*Z(1)-Z(5)*Z(2)
      B21=Z(4)
      B22=Z(5)
      BR0=Z(3)-Z(14)*Z(1)-Z(15)*Z(2)
      BR1=Z(14)
      BR2=Z(15)
      BI0=Z(3)-Z(16)*Z(1)-Z(17)*Z(2)
      BI1=Z(16)
      BI2=Z(17)
      Z(4)=Z(4)-BETA1
      Z(14)=Z(14)-BETA1
      IF (ABS(Z(4)).GT.ABS(Z(14))) KNT1=KNT1+1
      Z(16)=Z(16)-BETA1
      BETA=BETA2*AK50
      Z(5)=Z(5)-BETA
      Z(15)=Z(15)-BETA
      IF (ABS(Z(5)).GT.ABS(Z(15))) KNT2=KNT2+1
      Z(17)=Z(17)-BETA
      Z(11)=Z(11)-RHOU
      RK1S=RK1S+Z(13)
      RK2S=RK2S+Z(18)
      IF (Z(13).GT..99) KNTRK=KNTRK+1
      IF (Z(13).GT.RK1MAX) RK1MAX=Z(13)
      IF (Z(13).LT.RK1MIN) RK1MIN=Z(13)
      IF (Z(18).GT.RK2MAX) RK2MAX=Z(18)
      IF (Z(18).LT.RK2MIN) RK2MIN=Z(18)
      B21S=B21S+Z(4)
      BR1S=BR1S+Z(14)
      BI1S=BI1S+Z(16)
      B21SS=B21SS+Z(4)*Z(4)
      BR1SS=BR1SS+Z(14)*Z(14)
      BI1SS=BI1SS+Z(16)*Z(16)
      B22S=B22S+Z(5)
      BR2S=BR2S+Z(15)
      BI2S=BI2S+Z(17)
      B22SS=B22SS+Z(5)*Z(5)
      BR2SS=BR2SS+Z(15)*Z(15)
      BI2SS=BI2SS+Z(17)*Z(17)
      SEOBS=Z(8)
      RASS=RASS+Z(11)
      RASSS=RASSS+Z(11)*Z(11)
C
C     DETERMINE TRUE ERRORS
C
      CALL SETRUE (0.,BETA1,BETA,B20,B21,B22,AK50,TRE)
      CALL SETRUE (0.,BETA1,BETA,BR0,BR1,BR2,AK50,TRR)
      CALL SETRUE (0.,BETA1,BETA,BI0,BI1,BI2,AK50,TIR)
      TRES=TRE(1)+TRES
      TRET=TRE(2)+TRET
      TRRS=TRR(1)+TRRS
```

```
      TRRT=TRR(2)+TRRT
      TIRS=TIR(1)+TIRS
      TIRT=TIR(2)+TIRT
      TRESS=TRESS+TRE(1)**2
      TREST=TREST+TRE(2)**2
      TRRSS=TRRSS+TRR(1)**2
      TRRST=TRRST+TRR(2)**2
      TIRSS=TIRSS+TIR(1)**2
      TIRST=TIRST+TIR(2)**2
      SUMSE=SUMSE+SEOBS
      SUMSE2=SUMSE2+SEOBS*SEOBS
      SER1=SER1+Z(9)
      SER2=SER2+Z(10)
      SSER1=SSER1+Z(9)**2
      SSER2=SSER2+Z(10)**2
    6 CONTINUE
C
      NZ=NTIMES*IREP
      AMRK1=RK1S/NZ
      AMRK2=RK2S/NZ
      AMRE=TRES/NZ
      AMRT=TRET/NZ
      AMRR=TRRS/NZ
      AMRU=TRRT/NZ
      AMIR=TIRS/NZ
      AMIT=TIRT/NZ
      SDRE=(TRESS-TRES*TRES/NZ)/(NZ-1)
      SDRT=(TREST-TRET*TRET/NZ)/(NZ-1)
      SDRR=(TRRSS-TRRS*TRRS/NZ)/(NZ-1)
      SDRU=(TRRST-TRRT*TRRT/NZ)/(NZ-1)
      SDIR=(TIRSS-TIRS*TIRS/NZ)/(NZ-1)
      SDIT=(TIRST-TIRT*TIRT/NZ)/(NZ-1)
      SDRE=SQRT(SDRE)
      SDRT=SQRT(SDRT)
      SDRR=SQRT(SDRR)
      SDRU=SQRT(SDRU)
      SDIR=SQRT(SDIR)
      SDIT=SQRT(SDIT)
      AMSE=SUMSE/NZ
      SDSE=(SUMSE2-SUMSE*SUMSE/NZ)/NZ
      SDSE=SQRT(SDSE)
      AMB21=B21S/NZ
      AMBR1=BR1S/NZ
      AMBI1=BI1S/NZ
      AMB22=B22S/NZ
      AMBR2=BR2S/NZ
      AMBI2=BI2S/NZ
      SDB21=SQRT(B21SS/NZ)
      SDBR1=SQRT(BR1SS/NZ)
      SDBI1=SQRT(BI1SS/NZ)
      SDB22=SQRT(B22SS/NZ)
      SDBR2=SQRT(BR2SS/NZ)
      SDBI2=SQRT(BI2SS/NZ)
      AMRAS=RASS/NZ
      SDRAS=SQRT(RASSS/NZ)
      ASER1=SER1/NZ
      ASER2=SER2/NZ
      SDSER1=SQRT((SSER1-SER1*SER1/NZ)/NZ)
      SDSER2=SQRT((SSER2-SER2*SER2/NZ)/NZ)
C
C     PRINT RESULTS
```

```
C
      WRITE (6,15)
      WRITE (6,16) AMRE,SDRE,AMRT,SDRT
      WRITE (6,17) AMRR,SDRR,AMRU,SDRU
      WRITE (6,18) AMIR,SDIR,AMIT,SDIT
      WRITE (6,27) AMSE,SDSE
      WRITE (6,28) ASER1,SDSER1
      WRITE (6,29) ASER2,SDSER2
      WRITE (6,19)
      WRITE (6,20) AMB21,SDB21
      WRITE (6,21) AMB22,SDB22
      WRITE (6,23) AMBR1,SDBR1,AMRK1,RK1MAX,RK1MIN
      WRITE (6,24) AMBR2,SDBR2
      WRITE (6,25) AMBI1,SDBI1,AMRK2,RK2MAX,RK2MIN
      WRITE (6,26) AMBI2,SDBI2
      WRITE (6,22) AMRAS,SDRAS
      WRITE (6,30) KNT1,KNT2
      WRITE (6,31) KNTRK
      WRITE (7,9) AMRE,AMRR,AMIR,AMSE,ASER1,ASER2,SDRE,SDRR,SDIR,SDSE,SD
     1SER1,SDSER2
      WRITE (7,10) AMB21,AMB22,AMBR1,AMBR2,AMBI1,AMBI2,SDB21,SDB22,SDBR1
     1,SDBR2,SDBI1,SDBI2
      WRITE (7,11) AMRAS,SDRAS,AMRK1,RK1MAX,RK1MIN,AMRK2,RK2MAX,RK2MIN
      WRITE (7,12) AMRT,AMRU,AMIT,SDRT,SDRU,SDIT,KNT1,KNT2
      GO TO 1
C
C     FORMAT STATEMENTS
C
    7 STOP
C
    8 FORMAT (8F5.2,2I4,F5.2,I3,I6,I5,F6.3)
    9 FORMAT (12F6.3)
   10 FORMAT (6F7.3,6F6.3)
   11 FORMAT (8F10.4)
   12 FORMAT (6F10.3,2I6)
   13 FORMAT (8F5.0,2I5,F5.0,3I5,F5.0)
   14 FORMAT (1H1,///,7X,'A1',T14,'A0',T22,'S1',T30,'S0',T38,'BETA1',T46
     1,'BETA2',T54,'ALPHA1',T62,'ALPHA2',T70,'NB',T78,'NY',T86,'ROCRS',T
     294,'NTIMES',T102,'IREP',T110,'IRAND',T118,' RHO',/,1X,8F8.2,2I8,F8
     3.2,3I8,F6.3)
   15 FORMAT (//,' STATISTICS OF ERRORS      ',T70,' ERROR W/ ASCOV=0',/,
     1T20,' MEAN',T40,'STD DEV',T70,' MEAN',T80,' STD DEV')
   16 FORMAT (/,' TRUE SE (OLS)    ',T20,F9.3,T40,F9.3,T70,2F10.3)
   17 FORMAT (/,' TRUE SE (RIDGE1)',T20,F9.3,T40,F9.3,T70,2F10.3)
   18 FORMAT (/,' TRUE SE (RIDGE2)',T20,F9.3,T40,F9.3,T70,2F10.3)
   19 FORMAT (//,'      REGRESSION COEFFICIENTS',T65,' BIASING PARAMETER'
     1,/,T20,' BIAS',T40,' RMSE',T60,'MEAN',T70,' MAX',T80,' MIN')
   20 FORMAT (/,' B1 ',T20,F9.3,T40,F9.3)
   21 FORMAT (/,' B2 ',T20,F9.3,T40,F9.3)
   22 FORMAT (/,'  R ',T20,F9.3,T40,F9.3)
   23 FORMAT (/,' BR1',T20,F9.3,T40,F9.3,5X,3F10.4)
   24 FORMAT (/,' BR2',T20,F9.3,T40,F9.3)
   25 FORMAT (/,' BI1',T20,F9.3,T40,F9.3,5X,3F10.4)
   26 FORMAT (/,' BI2',T20,F9.3,T40,F9.3)
   27 FORMAT (/,' OBS. SE (OLS)    ',T20,F9.3,T40,F9.3)
   28 FORMAT (/,' OBS. SE (RIDGE1)',T20,F9.3,T40,F9.3)
   29 FORMAT (/,' OBS. SE (RIDGE2)',T20,F9.3,T40,F9.3)
   30 FORMAT (//,' NO. OF TIMES RIDGE1 EST. OF B1 BETTER THAN OLS',I5,/,
     1' NO. OF TIMES RIDGE1 EST. OF B2 BETTER THAN OLS',I5)
   31 FORMAT (1X,' NO. OF TIMES K=1',I5)
      END
```

```
      SUBROUTINE SETRUE (A,B,C,AHAT,BHAT,CHAT,XKT,TRU)
C
C     COMPUTES TRUE STANDARD ERRORS
C
      DIMENSION TRU(2)
      COMMON /ARMOD/ ARMU,ARSIG,SLMU,SLSIG,ASCOV,ERMEAN,ERSTD
      X1=AHAT-A
      X2=BHAT-B
      X3=CHAT-C
      F1=X1**2+(ARSIG**2+ARMU**2)*X2**2+(SLSIG**2+SLMU**2)*X3**2
      F2=2.0*X1*(X2*ARMU+X3*SLMU)
      F3=2.0*X2*X3*(ASCOV+ARMU*SLMU)
      F4=ERMEAN**2+(XKT*ERSTD)**2
      TRU(1)=F1+F2+F3+F4
      TRU(1)=SQRT(TRU(1))
      F5=2.0*X2*X3*ARMU*SLMU
      TRU(2)=F1+F2+F4+F5
      TRU(2)=SQRT(TRU(2))
      RETURN
      END
```

```
      SUBROUTINE RIDGE2 (X1,X2,N,Y,YHAT,RESID,Z)
C
C     COMUTES OLS AND RIDGE PARAMETER ESTIMATES
C
      REAL X1(50),X2(50),Y(50),YHAT(50),RESID(50),Z(18)
      X1M=0.0
      X2M=0.0
      YM=0.0
      X1S=0.0
      X2S=0.0
      X1Y=0.0
      X2Y=0.0
      X1X2=0.0
      YS=0.0
      DO 1 I=1,N
      X1M=X1M+X1(I)/N
      X2M=X2M+X2(I)/N
      YM=YM+Y(I)/N
    1 CONTINUE
      DO 2 I=1,N
      X1S=X1S+(X1(I)-X1M)**2
      X2S=X2S+(X2(I)-X2M)**2
      X1X2=X1X2+(X1(I)-X1M)*(X2(I)-X2M)
      X1Y=X1Y+(X1(I)-X1M)*(Y(I)-YM)
      X2Y=X2Y+(X2(I)-X2M)*(Y(I)-YM)
      YS=YS+(Y(I)-YM)**2
    2 CONTINUE
      RX1X2=X1X2/SQRT(X1S*X2S)
      YVAR=YS/(N-1)
      X1NUM=X2S*X1Y-X1X2*X2Y
      X2NUM=X1S*X2Y-X1X2*X1Y
      DNM=X1S*X2S-X1X2**2
      R1Y=X1Y/SQRT(X1S*YS)
      R2Y=X2Y/SQRT(X2S*YS)
      BYX1=X1NUM/DNM
      BYX2=X2NUM/DNM
      RESMU=0.0
      RESVAR=0.0
```

```
      DO 3 I=1,N
      YHAT(I)=YM+BYX1*(X1(I)-X1M)+BYX2*(X2(I)-X2M)
      RESID(I)=Y(I)-YHAT(I)
      RESMU=RESMU+RESID(I)/N
      RESVAR=RESVAR+RESID(I)**2
    3 CONTINUE
      RESVAR=RESVAR/(N-3)
      SEST=SQRT(RESVAR)
      Z(1)=X1M
      Z(2)=X2M
      Z(3)=YM
      Z(4)=BYX1
      Z(5)=BYX2
      Z(6)=RESMU
      Z(7)=RESVAR
      Z(8)=SEST
      Z(11)=RX1X2
      KK=-1
      RK=0.
    4 DETA=(1.+RK)*(1.+RK)-RX1X2*RX1X2
      B11=(1.+RK)/DETA
      B12=-RX1X2/DETA
      DEL1=(B11*R1Y+B12*R2Y)*SQRT(YS)
      DEL2=(B12*R1Y+B11*R2Y)*SQRT(YS)
      KK=KK+1
      RK=Z(7)*2./(DEL1**2+DEL2**2)
      IF (RK.GT.1.) RK=1.0
      IF (KK.EQ.0) Z(13)=RK
      IF (KK.EQ.1) Z(18)=RK
      IF (KK-1) 4,5,6
    5 Z(14)=DEL1/SQRT(X1S)
      Z(15)=DEL2/SQRT(X2S)
      GO TO 4
    6 Z(16)=DEL1/SQRT(X1S)
      Z(17)=DEL2/SQRT(X2S)
      RRESS=0.
      RIESS=0.
      DO 7 I=1,N
      YEST=Z(3)-Z(14)*Z(1)-Z(15)*Z(2)+Z(14)*X1(I)+Z(15)*X2(I)
      YIEST=Z(3)-Z(16)*Z(1)-Z(17)*Z(2)+Z(16)*X1(I)+Z(17)*X2(I)
      RRESS=(Y(I)-YEST)**2+RRESS
    7 RIESS=(Y(I)-YIEST)**2+RIESS
      Z(9)=SQRT(RRESS/(N-3))
      Z(10)=SQRT(RIESS/(N-3))
      RETURN
      END
```

```
      SUBROUTINE FLOW (IRAND)
C
C     STREAMFLOW GENERATOR
C MODIFIED VERSION OF PROGRAM BY J.R. SLACK, USGS
C
      COMMON /FLOW1/ XBAR(50),XSTD(50),XMU(50),SIGMA(50)
      COMMON /FLOW2/ E(50),B(50,50),SUM(50),XVAR(50),XMEAN(50),SSQ(50)
      REAL XLAST(50)
      COMMON /FLOW3/ RHO,YFAC,NS,NYR
      INTEGER*6 IRAND
      DATA XLAST/50*0.0/
      DO 1 IS=1,NS
      SSQ(IS)=0.
    1 SUM(IS)=0.0
      DO 3 IY=1,NYR
      DO 3 IS=1,NS
      E(IS)=GAUSSB(IRAND)
      XL=RHO*XLAST(IS)
      DO 2 JS=1,IS
    2 XL=XL+B(IS,JS)*E(JS)
      XLAST(IS)=XL
      SSQ(IS)=SSQ(IS)+XL*XL
    3 SUM(IS)=SUM(IS)+XL
      DO 4 IS=1,NS
      XB=SUM(IS)*XVAR(IS)+XMEAN(IS)
      XBAR(IS)=XB
    4 XSTD(IS)=SQRT(SSQ(IS)*XVAR(IS)**2*NYR-(XMEAN(IS)-XB)**2)*YFAC
      RETURN
      END


      SUBROUTINE FST (SERIAL,CROSS,NYEARS,NSITES)
C
C     SET UP DATA FOR STREAMFLOW GENERATOR
C MODIFIED VERSION OF PROGRAM BY J.R. SLACK, USGS
C
      COMMON /FLOW1/ XBAR(50),XSTD(50),XMU(50),SIGMA(50)
      COMMON /FLOW2/ E(50),B(50,50),SUM(50),XVAR(50),XMEAN(50),SSQ(50)
      COMMON /FLOW3/ RHO,YFAC,NS,NYR
      RHO=SERIAL
      RHOT=CROSS
      NYR=NYEARS
      Y=1.0/NYR
      YFAC=SQRT(1./(1.-Y))
      NS=NSITES
      DO 1 IS=1,NS
      XVAR(IS)=SIGMA(IS)*Y
    1 XMEAN(IS)=XMU(IS)
      CDIAG=1.0-RHO*RHO
      COD=RHOT*CDIAG
      B11=SQRT(CDIAG)
      B1=B11*RHOT
      S1=CDIAG-B1*B1
      B(1,1)=B11
      B(2,1)=B1
      B(2,2)=SQRT(S1)
      IF (NS.LE.2) RETURN
      DO 4 IS=3,NS
      B(IS,1)=B1
      BN=S1
```

```
      ISM=IS-1
      DO 3 JS=2,ISM
      JSM=JS-1
      BH=COD
      DO 2 KS=1,JSM
    2 BH=BH-B(IS,KS)*B(JS,KS)
      B(IS,JS)=BH/B(JS,JS)
    3 BN=BN-B(IS,JS)**2
    4 B(IS,IS)=SQRT(BN)
      RETURN
      END
```

//

```
      SUBROUTINE RANDUV (IX,V,N)
C GENERATE VECTOR OF UNIFORM RANDOM NUMBERS
C HARRIS FORTRAN PROGRAM BY JR SLACK, USGS
C
      REAL V(N)
      INTEGER*6 IX,HX
      DOUBLE PRECISION DIV
      DATA DIV/2147483648.0D0/
      DO 1 I=1,N
      HX=IX*16807D
      IX=HX-(HX/2147483647D)*2147483647D
      V(I)=IX/DIV
    1 CONTINUE
      RETURN
      END


C GENERATE UNIFORM RANDOM NUMBER
C HARRIS FORTRAN PROGRAM BY JR SLACK, USGS
      FUNCTION RANDUB (IX)
C
      INTEGER*6 IX,HX
      DOUBLE PRECISION DIV
      DATA DIV/2147483648.0D0/
      HX=IX*16807D
      IX=HX-(HX/2147483647D)*2147483647D
      RANDUB=IX/DIV
      RETURN
      END


C GENERATE NORMAL RANDOM NUMBER
C HARRIS FORTRAN PROGRAM BY JR SLACK; USGS
      FUNCTION GAUSSB (IRAND)
C     CHEN - JASA,JUN 71,P.400
      INTEGER*6 IRAND
      LOGICAL HAVE
      DOUBLE PRECISION TWOPI,MINUS2,ANGLE,DIST
      DATA HAVE/.FALSE./,TWOPI/6.2831853072D0/,MINUS2/-2.0D0/
      IF (HAVE) GO TO 1
      ANGLE=TWOPI*DBLE(RANDUB(IRAND))
      DIST=DSQRT(MINUS2*DLOG(DBLE(RANDUB(IRAND))))
      Z=DIST*DSIN(ANGLE)
      GAUSSB=DIST*DCOS(ANGLE)
      HAVE=.TRUE.
      RETURN
    1 GAUSSB=Z
      HAVE=.FALSE.
      RETURN
      END


C GENERATE VECTOR OF NORMAL RANDOM NUMBERS
C HARRIS FORTRAN PROGRAM BY JR SLACK, USGS
      SUBROUTINE GAUSSV (IRAND,V,N)
C     CHEN - JASA,JUN 71,P.400
      DIMENSION V(1)
      DOUBLE PRECISION TWOPI,MINUS2,ANGLE,DIST
```

```
      INTEGER*6 IRAND
      DATA TWOPI/6.2831853072D0/,MINUS2/-2.0D0/
      CALL RANDUV (IRAND,V,N)
      L=N/2
      DO 1 I=1,L
      K=2*I
      ANGLE=TWOPI*DBLE(V(K-1))
      DIST=DSQRT(MINUS2*DLOG(DBLE(V(K))))
      V(K-1)=DIST*DCOS(ANGLE)
      V(K)=DIST*DSIN(ANGLE)
    1 CONTINUE
      IF (2*L.EQ.N) RETURN
      ANGLE=TWOPI*DBLE(RANDUB(IRAND))
      DIST=DSQRT(MINUS2*DLOG(DBLE(V(N))))
      V(N)=DIST*DSIN(ANGLE)
      RETURN
      END


C CUMULATIVE FREQUENCY OF NORMAL NUMBER
      FUNCTION GAUSCF (XX)
C
      AX=ABS(XX)
      GAUSCF=1.
      IF (AX.GT.10.0) GO TO 1
      T=1.0/(1.0+.2316419*AX)
      D=0.3989423*EXP(-XX*XX*.5)
      GAUSCF=1.-D*T*((((1.330274*T-1.821256)*T+1.781478)*T-0.3565638)*T+
     10.3193815)
    1 CONTINUE
      IF (XX.LT.0) GAUSCF=1.-GAUSCF
      RETURN
      END
```

APPENDIX C -- METHOD FOR GENERATING CORRELATED UNIFORMLY DISTRIBUTED RANDOM NUMBERS

Suppose that X_i and Y_i are n x 1 vectors of independent normally distributed random numbers with means of zero and variances of one. If

$$Z_i = \rho_n Y_i + (1-\rho_n^2)^{1/2} X_i, \quad \text{then}$$

Z_i is an n x 1 vector of normally distributed random numbers hich has a mean of zero, variance of one, and a correlation with Y_i of ρ_n. Let

$$U_i = P(Y_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Y_i} \exp(-w^2/2)\, dw \qquad (1)$$

and

$$V_i = P(Z_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Z_i} \exp(-w^2/2)\, dw \qquad (2)$$

The right side of equations 1 and 2 will be recognized as the cumulative probability function for a standardized normal distribution. Therefore, U_i and V_i will be n x 1 vectors of uniform random numbers between zero and one.

In addition, because Y_i and Z_i are correlated, U_i and V_i are correlated and have correlation coefficient ρ_u. But what is the relationship between ρ_u and ρ_n?

Relationship Between ρ_u and ρ_n

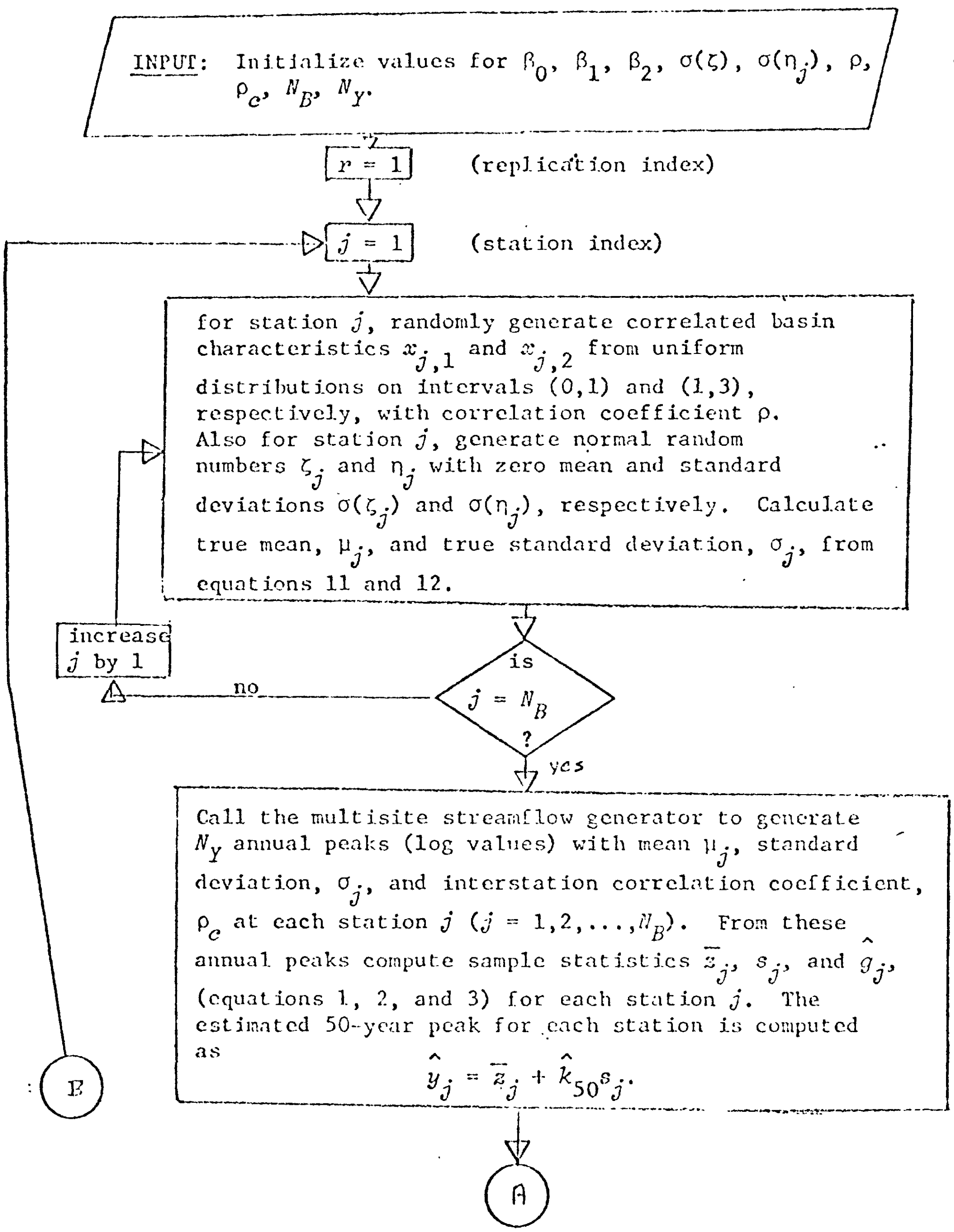
The relationship between ρ_u and ρ_n has been developed empirically by generating a sample of size 2000 and calculating sample estimates of ρ_u and ρ_n as described above and denoted by $\hat{\rho}_u$ and $\hat{\rho}_n$, respectively. A second sample of size 2000 was generated for verification. Results (table 1C) indicate that ρ_u will be slightly smaller in absolute value than ρ_n except when ρ_n is equal to -1, 0, or 1. A linear fit of the relationship between ρ_u and ρ_n was obtained by regression analysis as

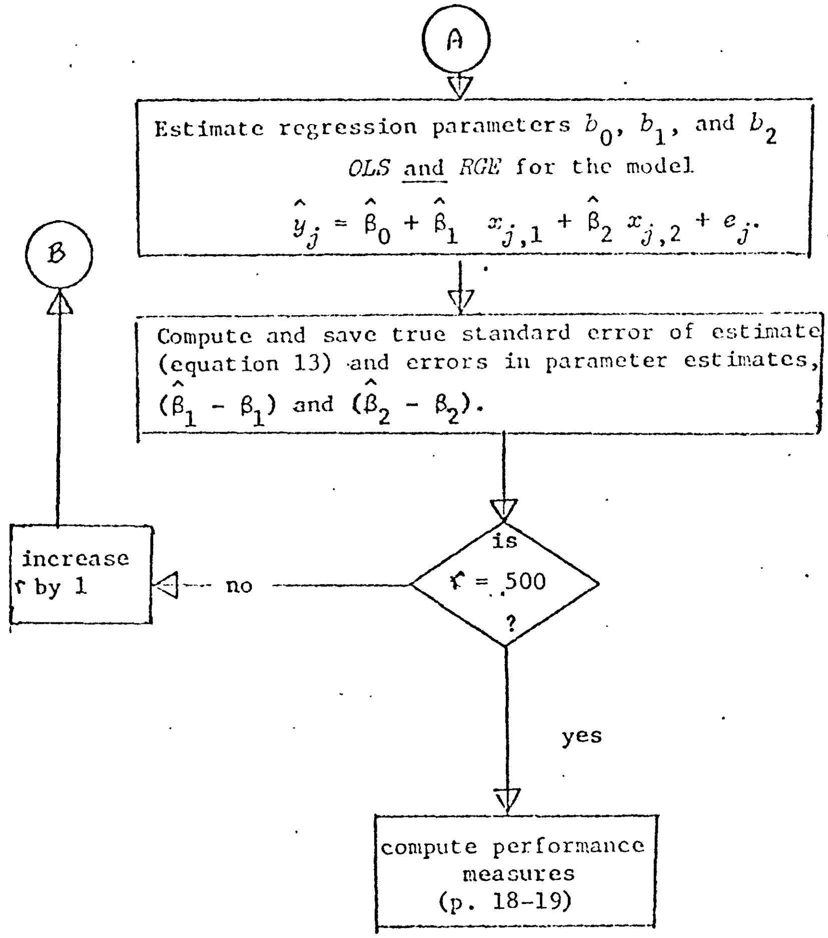
$$\rho_u = \rho_n - .020 \sin(\pi \rho_n).$$

Table 1C: Relationship Between ρ_u and ρ_n

	SAMPLE 1		SAMPLE 2	
ρ	$\hat{\rho}_n$	$\hat{\rho}_u$	$\hat{\rho}_n$	$\hat{\rho}_u$
-1.000	-1.0000	-.9991	-1.0000	-.9991
- .900	- .8922	-.8831	- .9016	-.8904
- .800	- .8009	-.7880	- .8078	-.7952
- .700	- .7021	-.6777	- .7106	-.6937
- .600	- .6168	-.5900	- .5923	-.5733
- .500	- .5165	-.5041	- .5432	-.5192
- .400	- .4316	-.4278	- .3925	-.3708
- .300	- .3268	-.3136	- .2837	-.2767
- .200	- .1846	-.1858	- .2417	-.2285
- .100	- .0850	-.0788	- .1263	-.1167
0.	.0232	.0225	.0261	.0169
.1	.1111	.1002	.0633	.0555
.2	.1890	.1772	.1958	.1823
.3	.2668	.2517	.2664	.2668
.4	.4423	.4184	.3897	.3691
.5	.4851	.4638	.5263	.5071
.6	.6017	.5764	.6032	.5819
.7	.6943	.6775	.7083	.6936
.8	.7944	.7743	.8049	.7915
.9	.8935	.8891	.9001	.8947
1.0	1.0000	1.0000	1.0000	1.0000

Appendix D--Flow chart of a simulation experiment.




A
Estimate regression parameters b_0, b_1, and b_2
OLS and *RGE* for the model
$\hat{y}_j = \hat{\beta}_0 + \hat{\beta}_1 x_{j,1} + \hat{\beta}_2 x_{j,2} + e_j$.
Compute and save true standard error of estimate (equation 13) and errors in parameter estimates, $(\hat{\beta}_1 - \beta_1)$ and $(\hat{\beta}_2 - \beta_2)$.
is r = 500 ?
no
increase r by 1
B
yes
compute performance measures (p. 18-19)

NOTATIONS

a	constant
$a_1, a_2, a_3, \ldots, a_m$	constants
b_p	pth sample estimate of β_p
$\underline{e}$	$N \times 1$ vector of random disturbances with $E(\underline{e}) = \underline{0}$ and $E(\underline{e}\underline{e}') = \sigma^2\underline{I}$, where $\underline{0}$ is a vector of zeros
g_j	sample skew coefficient, computed by method of moments, at station j
$\bar{g}_j$	regional (generalized) skew coefficient for station j
$\hat{g}_j$	WRC weighted skew coefficient at station j
k	ridge biasing parameter
k_T	standardized Pearson Type III deviate for T-year return period
k_0	the standardized Pearson Type III deviate for a 50-year return period and skew coefficient of zero
$\hat{k}_{50}$	the standardized Pearson Type III deviate for a 50-year recurrence interval and weighted skew coefficient $\hat{g}_j$
n_j	number of observed annual peaks at station j
r	index of replications, $r = 1, 2, \ldots, NR$
s_j	standard deviation of logarithms of observed annual peaks at station j
u_{jp}	"unit length" standardization of X_{jp}
v_j	"unit length" standardization of y_j
$\underline{y}_j$	T-year peak discharge, in log units, at station j
$\bar{y}$	mean of y_j's
$\underline{z}_{ij}$	ith observed annual peak, in log units, at station j
$\bar{z}_j$	mean of logarithms of observed annual peaks at station j
A	basin characteristic
BIAS_B1O	bias in OLS estimate of β_1
BIAS_B2O	bias in OLS estimate of β_2
BIAS_B1R	bias in RGE estimate of β_1
BIAS_B2R	bias in RGE estimate of β_2
BIAS_RHO	average deviation of $\hat{\rho}$ from ρ computed over the number of replications of an experiment
$\underline{I}$	$M \times M$ identity matrix

$\underline{J}$	N x 1 vector of 1's
K_MAX	maximum value of k computed over the number of replications of an experiment
K_MEAN	mean value of k computed over the number of replications of an experiment
K_MIN	minimum value of k computed over the number of replications of an experiment
L^2	quadratic loss function, $(\hat{\underline{\alpha}} - \alpha)'(\hat{\underline{\alpha}} - \alpha)$
$L^2(k)$	quadratic loss function, $(\hat{\underline{\alpha}}(k) - \alpha)'(\hat{\underline{\alpha}}(k) - \alpha)$
M	number of basin characteristics in model
MOSE_OLS	mean observed standard error using OLS
MOSE_RGE	mean observed standard error using RGE
MTSEO_O	mean true standard error using OLS when the population covariance of x_1 and x_2 is zero
MTSEO_R	mean true standard error using RGE when population covariance of x_1 and x_2 is zero
MTSE_OLS	mean true standard error using OLS
MTSE_RGE	mean true standard error using RGE
N	number of stations in region
NR	number of replications of a given experiment
*P_RGE*1	probability that RGE estimate of β_1 is better than the OLS estimate
*P_RGE*2	probability that RGE estimate of β_2 is better than the OLS estimate
Q_{50}	50-year peak discharge
R_p^2	coefficient of multiple determination from regression of the ith basin characteristic on all other basin characteristics in the regression
*RB*1	*RMSE_B1R*/*RMSE_B1O*
*RB*2	*RMSE_B2R*/*RMSE_B2O*
RMSE_B1O	root-mean-square error of OLS estimate of β_1
RMSE_B2O	root-mean-square error of OLS estimate of β_2
RMSE_B1R	root-mean-square error of RGE estimate of β_1
RMSE_B2R	root-mean-square error of RGE estimate of β_2
RMSE_RHO	root-mean-square deviation of $\hat{\rho}$ from ρ computed over the number of replications of an experiment
*RSET*1	*MTSEO_R*/*MTSEO_O*

RTSE	*MTSE_RGE/MTSE_OLS*
S	basin characteristic
S_p^2	sum of squared deviations of X_{jp} about $\bar{X}_p$
S_y^2	sum of squared deviations of y_i about $\bar{y}$
SE_T^2	total mean square error of prediction
SOSE_RGE	standard deviation of observed standard error using *RGE*
SOSE_OLS	standard deviation of observed standard error using *OLS*
STSE_OLS	standard deviation of true standard error using *OLS*
STSE_RGE	standard deviation of true standard error using *RGE*
STSEO_O	standard deviation of true standard error using *OLS* when population covariance of x_1 and x_2 is zero
STSEO_R	standard deviation of true standard error using *RGE* when population covariance of x_1 and x_2 is zero
T	return period, in years
$\underline{U}$	N x M matrix of standardized basin characteristics in correlation form
$\underline{V}$	N x 1 vector of standardized annual peaks
VIF	variance inflation factor
x_1	$\log_{10}A$
x_2	$\log_{10}S$
X_{jp}	pth unstandardized basin characteristic for station j
$\bar{X}_p$	mean of X_{jp}'s for pth basin characteristic
$\underset{\sim}{X}$	N x M matrix of observations on basin characteristics
Y	$\log_{10}Q_{50}$
Y_j	estimated value of Y at station j
$\underline{Y}$	N x 1 vector of observations of annual peaks, in log units
$\underline{\alpha}$	M x 1 vector of regression coefficients for standardized model
$\hat{\underset{\sim}{\alpha}}$	M x 1 vector of ordinary least squares estimate of $\underline{\alpha}$
$\underline{\alpha}(k)$	M x 1 vector of ridge estimate of $\underline{\alpha}$
$\underline{\beta}$	M x 1 vector of regression coefficients
β_0	regression constant associated with unstandardized model
β_p	regression coefficient associated with the pth unstandardized basin characteristic, X_{jp}

∂_j	random disturbance which measures discrepancy in the linear regression model
ε_j	random variable with zero mean and variance proportional to σ_j^2/n_j
ζ_j	normally and independently distributed random disturbance with zero mean and variance $\sigma^2(\zeta_j)$
η_j	normally and independently distributed random distrubance with zero mean and variance $\sigma^2(\eta_j)$
λ_p	characteristic roots of $\underline{u}'\underline{u}$
μ_j	population mean of logarithms of annual peak discharges at station j
μ_{x_1}	population mean of basin characteristic x_1
μ_{x_2}	population mean of basin characteristic x_2
ρ	population correlation coefficient between x_1 and x_2 of the generated sample
ρ_c	the cross correlation between logarithms of annual peaks for any pair of stations
ρ_{50}	interstation correlation between observed 50-year peaks
σ^2	variance of regression error
$\hat{\sigma}^2$	standard error of estimate, sample estimate of σ^2
σ_j	population variance of logarithms of annual peak discharges at station j
$\sigma^2(\zeta_j)$	the portion of "model error" associated with μ_j
$\sigma^2(\eta_j)$	the portion of "model error" associated with σ_j^2
$\sigma_{x_1}^2$	population variance of x_1
$\sigma_{x_2}^2$	population variance of x_2