Double Unit Roots Testing, GLS-detrending and Uncertainty over the Initial Conditions

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Abstract

This paper proposes the extension of the Hasza and Fuller (1979) test for double unit roots based on GLS-detrending. The limiting distribution of this test is obtained under local to unity representation and coincides with the distribution of the conventional test in the absence of a deterministic component. The proposed test has both better asymptotic and finite sample properties in comparison to tests based on OLS-detrending. This paper proposes modified information criteria for the implementation of the proposed test for double unit roots in finite samples in which an additional term is incorporated into the penalty function. This provides better size control under various data generating processes, especially for strongly negative moving average components. This paper also analyzes the power behavior of tests under non-negligible initial conditions and proposes union of rejection testing strategy of three tests following the Harvey *et al.* (2009) approach. This strategy is more robust across various magnitudes of the initial conditions and eliminates large power losses that occur due to the use of only one of the tests.
Key words: Double unit roots test, GLS-detrending, lag length selection, information criteria, uncertainty over the initial conditions, union of rejection.
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1 Introduction

Most economic time series are recognized to be non-stationary which can be proven by the non-rejection of a unit root hypothesis. The integration of order one, I(1), is considered to be the most common for many macroeconomic time series. However, some time series (like prices, monetary aggregates, etc.) appear to be smoother, which may indicate the potential integration of order two, I(2). The consequences of I(2)-ness are not only important for the analysis of one-dimensional time series, but also in the context of cointegration analysis (see Haldrup (1998) as a survey), so that the researcher should choose whether to use the cointegration model with I(2) variables or to restrict himself to the I(1)-analysis. The most common approaches for double unit roots testing are the method proposed by Hasza and Fuller (1979)[1], based on testing the I(2) hypothesis against the alternative that the series is either explosive, I(1), or I(0), and the method proposed by Dickey and Pantula (1987), based on sequential testing first I(2) against I(1), and then in case of rejection of the null hypothesis – I(1) against I(0). However, the second approach does not allow the possible explosive character of one or two characteristic roots.[2] If at least one of the roots is greater than unity (explosive process), in the first step of the Dickey-Pantula procedure we will rarely reject the hypothesis of I(2)-ness. We also note the work of Sen and Dickey (1987), where the symmetric test is proposed (in Haldrup (1994) its non-parametric correction is proposed in the presence of a weak dependence of errors).

The effect of different types of detrending is widely analyzed in the context of the unit root testing of the data. However for tests for double unit roots this question has been studied only in the work of Rodrigues and Taylor (2004). Authors show that the claim of the coincidence of the two approaches, direct and indirect detrending, is false, and tests with different detrending methods differ even asymptotically. Also, in the case of the Hasza-Fuller test, GLS-detrending, which has since gained great popularity in theoretical and empirical works since an article was published by Elliott *et al.* (1996) (hereafter ERS), still was not developed. In this paper, we address this problem.

The second important issue relates to the correction of the weak dependence of the error term: both the non-parametric correction of Shin and Kim (1999) and augmenting the regression with lags of second differences lead to serious size distortion under very large negative moving-average root in the error term. Ng and Perron (2001) solve this problem in the context of unit root testing by providing modified information criteria for the choice of lag order. The modification is the incorporation of an additional term that depends on the data to the penalty function. However for the double unit roots tests this problem is not discussed and in this paper we investigate corresponding modifications for information criteria.

Finally, Rodrigues and Taylor (2004) consider the problem of asymptotically non-negligible initial conditions and show that under the null hypothesis Hasza-Fuller tests are invariant to the initial conditions if the trend is allowed (by direct or indirect detrending) in the regression. However the power behavior is not analyzed under initial conditions of different magnitudes. In the unit root testing context those studies have been investigated by Elliott (1999), Muller and Elliott (2003), Elliott and Muller (2006) and Harvey *et al.* (2009). In this paper we extend their analysis to the case of double unit roots testing, obtain corresponding limiting distributions and analyze

[1] In Shin and Kim (1999) the nonparametric correction of Hasza-Fuller test is proposed in the presence of a weak dependence of errors.

[2] There is a growing literature concerned with the investigation of explosive behavior of the time series, see Phillips *et al.* (2011), Phillips *et al.* (2012) and Harvey and Leybourne (2014), *inter alia*.

the power curves. Also, similar to Harvey *et al.* (2009), we propose the union of the rejection decision rule to avoid the power losses for some tests and to use the power gain for others.

Thus, this paper consists of the following sections. In Section 2, the data generating process and conventional tests with direct and indirect detrending are formulated. In Section 3, the GLS-detrending procedure is proposed, the limiting distributions of all considered tests are obtained under local to unity behavior of autoregressive parameters, and the asymptotic behavior of these tests is analyzed. Finite sample behavior is investigated in Section 4, in particular, the choice of non-centrality parameters is justified for GLS-detrending. Also, modified information criteria are proposed for lag length selection and the results of implementation of these criteria are discussed. In Section 5 the behavior of the tests is analyzed under asymptotically non-negligible initial conditions, and the union of a rejection testing strategy of three tests is proposed. Section 6 concludes this paper. All proofs are provided in the Appendix.

2 Model

Consider the time series $\{y_t\}$, which is generated according to the following model:

$$\begin{aligned} y_t &= \mu + \beta t + u_t,\ t = -1, 0, \ldots, T, &(1)\\ \phi(L)u_t &= \varepsilon_t,\ t = 1, \ldots, T, &(2)\end{aligned}$$

where $\phi(z) = (1 - \phi_1 z)(1 - \phi_2 z)$ is a second order autoregressive polynomial, L is a lag operator such that $L^k y_t = y_{t-k}$. The assumptions about initial conditions u_{-1} and u_0 will be formulated later. The errors ε_t is taken to satisfy the following assumption.

Assumption 1 *The error term ε_t is the linear process as*

$$\varepsilon_t = \gamma(L)e_t = \sum_{i=0}^{\infty} \gamma_i e_{t-i},$$

with $\gamma(z) \neq 0$ for all $|z| \leq 1$ and $\sum_{i=0}^{\infty} i|\gamma_i| < \infty$. The e_t process is the martingale-differences sequence with conditional variance σ_e^2 and $\sup_t \mathbb{E}(e_t^4) < \infty$. Short-run and long-run variances are defined as $\sigma_\varepsilon^2 = E(\varepsilon_t^2)$ and $\omega_\varepsilon^2 = \lim_{T\to\infty} T^{-1}\mathbb{E}\left(\sum_{t=1}^{T}\varepsilon_t\right)^2 = \sigma_e^2\gamma(1)^2$, respectively.

Our purpose is to test the null hypothesis that $y_t \sim I(2)$, i.e.

$$H_0 : \phi_1 = \phi_2 = 1$$

against the alternative that y_t is either explosive, $I(1)$, or $I(0)$,

$$H_1 : \phi_1 \neq 1 \cup \phi_2 \neq 1.$$

The approach used by Hasza and Fuller (1979) for testing the null hypothesis proposes rewriting (1) and (2) (under i.i.d. errors) as

$$\Delta^2 y_t = \mu^* + \beta^* t + \rho_1 y_{t-1} + \rho_2 \Delta y_{t-1} + \epsilon_t, \quad (3)$$

where (μ^*, β^*) and (μ, β) form a one-to-one mapping, $\rho_1 = -(1-\phi_1)(1-\phi_2)$ and $\rho_2 = (\phi_1\phi_2 - 1)$. This representation allows us to reformulate the null hypothesis as

$$H_0 : \rho_1 = \rho_2 = 0 \tag{4}$$

and the alternative hypothesis as

$$H_1 : \rho_1 \neq 1 \cup \rho_2 \neq 1. \tag{5}$$

Hasza and Fuller (1979) propose using the F test for excluding both y_{t-1} and Δy_{t-1} regressors from (3) (indirect detrending, denote this test as F_i^{OLS}). However, another way of detrending, called direct detrending, is possible, when the series y_t is first detrended, and then the OLS-detrended residuals $\hat{y}_t$ are used in the following regression:

$$\Delta^2 \hat{y}_t = \rho_1 \hat{y}_{t-1} + \rho_2 \Delta \hat{y}_{t-1} + \epsilon_t, \tag{6}$$

and then the F test for excluding both the $\hat{y}_{t-1}$ and the $\Delta\hat{y}_{t-1}$ regressors from (6) is implemented (direct detrending, denote this test as F_d^{OLS}). As Rodrigues and Taylor (2004) show, this detrending method leads to a different limiting distribution in comparison to the adding constant and trend in regression as in (3). Finally, note that if the errors ε_t are not i.i.d, but satisfy Assumption 1, then either a sufficient number of lags of $\Delta^2 y_t$ should be added to the regressions (3) and (6) or the F test should be non-parametrically corrected as in Haldrup (1994).

3 Test based on GLS-detrending

In this section we propose the modification of regression (6) by using GLS-detrended data. For the purposes of this section, we set initial conditions that will satisfy the following assumption.

Assumption 2 *The initial conditions are generated as*

$$u_0 = \xi_{-1} + \xi_0, \tag{7}$$

$$u_{-1} = \xi_{-1}, \tag{8}$$

where $\xi_{-1} = o_p(T^{3/2})$ *and* $\xi_0 = o_p(T^{1/2})$.

Assumption 2 implies that both u_0 and u_{-1} are $o_p(T^{3/2})$, and their difference $u_0 - u_1 = \xi_0$ is $o_p(T^{1/2})$. This is necessary to ensure that the initial condition for the differenced series Δy_t have the same order as the data itself. Assumption 2 ensures that the initial conditions do not affect the asymptotic behavior of the test statistics.

In OLS-detrending, the series transform as $\hat{y}_t = y_t - \hat{\gamma}'\mathbf{z}_t$, where $\mathbf{z}_t = (1, t)'$, and $\hat{\gamma}$ is the OLS-estimator of $\gamma = (\mu, \beta)'$, obtained from the regression of y_t on $\mathbf{z}_t$.

Consider the following GLS-transformation (similar to ERS), where the (quasi) differenced series $y_\mathbf{c}$ and $\mathbf{Z_c}$ are defined as

$$\begin{aligned} y_\mathbf{c} &= (y_1, y_2 - \phi_1^\mathbf{c} y_1, \Delta_\mathbf{c} y_3, \ldots, \Delta_\mathbf{c} y_T)' \\ \mathbf{Z_c} &= (\mathbf{z}_1, \mathbf{z}_2 - \phi_1^\mathbf{c} \mathbf{z}_1, \Delta_\mathbf{c} \mathbf{z}_3, \ldots, \Delta_\mathbf{c} \mathbf{z}_T)', \end{aligned}$$

where

$$\Delta_\mathbf{c} = 1 - \sum_{j=1}^{2} \phi_j^\mathbf{c} L^j = \left(1 - \left(1 + \frac{\bar{c}_1}{T}\right) L\right) \left(1 - \left(1 + \frac{\bar{c}_2}{T}\right) L\right)$$

(respectively, $\Delta_{\mathbf{0}} = (1-L)^2$). Then the GLS-detrended series are defined as $\tilde{y}_t = y_t - \tilde{\gamma}'\mathbf{z}_t$, where $\tilde{\gamma}$ is the (quasi) GLS-estimator of γ, obtained from the OLS-regression of $y_{\mathbf{c}}$ on $\mathbf{Z}_{\mathbf{c}}$. The following regression (similar to Hasza and Fuller (1979)) is constructed by using the GLS-detrended series:

$$\Delta^2 \tilde{y}_t = \rho_1 \tilde{y}_{t-1} + \rho_2 \Delta \tilde{y}_{t-1} + \varepsilon_t \tag{9}$$

and for testing the null hypothesis H_0 in (4) the F statistic (F^{GLS}) is constructed to exclude both the $\tilde{y}_{t-1}$ and the $\Delta\tilde{y}_{t-1}$ regressors from (6).

Now consider the asymptotic properties of F tests for regressions (3), (6) and (9) (respectively, F_i^{OLS}, F_d^{OLS} and F^{GLS}) under a near integration alternative

$$H_c : \phi_1 = 1 + \frac{c_1}{T},\ \phi_2 = 1 + \frac{c_2}{T}. \tag{10}$$

Note that H_c reduces to H_0 at $c_1 = c_2 = 0$. The asymptotic properties of the test are provided for in the following proposition (see proof in Appendix).

Proposition 1 *Let y_t be as* (1)-(2)*, and Assumptions 1 and 2 are hold. Then under H_c*

$$F^{GLS} \Rightarrow \{k'_{c_1c_2}N + k'_{c_1c_2}Mk_{c_1c_2} + N'k_{c_1c_2} + N'M^{-1}N\}, \tag{11}$$

where

$$M = \begin{pmatrix} \int_0^1 Q_{c_1}(J_{c_2}(r))^2 dr & \frac{1}{2}Q_{c_1}(J_{c_2}(1))^2 \\ \frac{1}{2}Q_{c_1}(J_{c_2}(1))^2 & c_1 Q_{c_1}(J_{c_2}(1))^2 - c_1^2\int_0^1 Q_{c_1}(J_{c_2}(r))^2 dr + \int_0^1 J_{c_2}(r)^2 dr \end{pmatrix},$$

$$N = \begin{pmatrix} \int_0^1 Q_{c_1}(J_{c_2}(r))dW(r) \\ c_1\int_0^1 Q_{c_1}(J_{c_2}(r))dW(r) + \int_0^1 J_{c_2}(r)dW(r) \end{pmatrix},\ k_{c_1c_2} = \begin{pmatrix} -c_1c_2 \\ c_1 + c_2 \end{pmatrix},$$

$$F_d^{OLS} \Rightarrow \{k'_{c_1c_2}N^d + k'_{c_1c_2}M^d k_{c_1c_2} + (N^d)'k_{c_1c_2} + (N^d)'(M^d)^{-1}N^d\}, \tag{12}$$

where

$$M^d = \begin{pmatrix} \int_0^1 \left[Q_{c_1}(J_{c_2}(r))^\tau\right]^2 dr & \int_0^1 Q_{c_1}(J_{c_2}(r))^\tau Q_{c_1}(J_{c_2}(r))^{d\tau} dr \\ \int_0^1 Q_{c_1}(J_{c_2}(r))^\tau Q_{c_1}(J_{c_2}(r))^{d\tau} dr & \int_0^1 \left[Q_{c_1}(J_{c_2}(r))^{d\tau}\right]^2 dr \end{pmatrix},$$

$$N^d = \begin{pmatrix} \int_0^1 Q_{c_1}(J_{c_2}(r))^\tau dW(r) \\ \int_0^1 Q_{c_1}(J_{c_2}(r))^{d\tau} dW(r) \end{pmatrix}$$

and

$$F_i^{OLS} \Rightarrow \{k'_{c_1c_2}N^i + k'_{c_1c_2}M^i k_{c_1c_2} + (N^i)'k_{c_1c_2} + (N^i)'(M^i)^{-1}N^i\}, \tag{13}$$

where

$$M^i = \begin{pmatrix} \int_0^1 \left[Q_{c_1}(J_{c_2}(r))^\tau\right]^2 dr & \int_0^1 Q_{c_1}(J_{c_2}(r))^\tau Q_{c_1}(J_{c_2}(r))^{d\tau,i} dr \\ \int_0^1 Q_{c_1}(J_{c_2}(r))^\tau Q_{c_1}(J_{c_2}(r))^{d\tau,i} dr & \int_0^1 \left[Q_{c_1}(J_{c_2}(r))^{d\tau,i}\right]^2 dr \end{pmatrix},$$

$$N^i = \begin{pmatrix} \int_0^1 Q_{c_1}(J_{c_2}(r))^\tau dW(r) \\ \int_0^1 Q_{c_1}(J_{c_2}(r))^{d\tau,i} dW(r) \end{pmatrix},$$

Here

$$\begin{aligned}
Q_{c_1}(J_{c_2}(r))^{\tau} &= Q_{c_1}(J_{c_2}(r))^{\mu} - 12\left(r-\frac{1}{12}\right)\int_0^1\left(s-\frac{1}{12}\right)Q_{c_1}(J_{c_2}(s))^{\mu}ds,\\
Q_{c_1}(J_{c_2}(r))^{\mu} &= Q_{c_1}(J_{c_2}(r)) - \int_0^1 Q_{c_1}(J_{c_2}(s))ds,\\
Q_{c_1}(J_{c_2}(r))^{d\tau,i} &= Q_{c_1}(J_{c_2}(r))^{d\mu} - 12\left(r-\frac{1}{12}\right)\int_0^1\left(s-\frac{1}{12}\right)Q_{c_1}(J_{c_2}(s))^{d\mu}ds,\\
Q_{c_1}(J_{c_2}(r))^{d\mu} &= c_1\left(Q_{c_1}(J_{c_2}(r)) - \int_0^1 Q_{c_1}(J_{c_2}(s))ds\right) + \left(J_{c_2}(r) - \int_0^1 J_{c_2}(s)ds\right),\\
Q_{c_1}(J_{c_2}(r))^{d\tau} &= c_1 Q_{c_1}(J_{c_2}(r)) + J_{c_2}(r) - 12\int_0^1\left(s-\frac{1}{12}\right)Q_{c_1}(J_{c_2}(s))^{\mu}ds,
\end{aligned}$$

$Q_{c_1}(J_{c_2}(r)) = \int_0^r \exp((r-s)c_1)J_{c_2}(s)ds$, $J_{c_2}(r) = \int_0^r \exp((r-s)c_2)dW(s)$ *is the Ornstein-Uhlenbeck process,* $W(r)$ *is the standard Wiener process, and* $\Rightarrow$ *denotes weak convergence.*

Remark 1. The limiting distribution of the F^{GLS} statistic coincides with the distribution obtained in Haldrup and Lildholdt (2005) with the absence of a deterministic component and does not depend on non-centrality parameters $\bar{c}_1$ and $\bar{c}_2$. Thus for GLS-detrending, power losses due to the presence of a linear trend in the model do not occur. Limiting distributions for the F_d^{OLS} and F_i^{OLS} tests follow directly from the results of Haldrup and Lildholdt (2005) and Rodrigues and Taylor (2004).

Remark 2. At $c_1 = c_2 = 0$ the distribution (11) is simplified to the one obtained in Hasza and Fuller (1979), so that the usual critical values corresponding to a case of the absence of a deterministic component can be used. Similarly, distributions (12) and (13) are simplified to the ones obtained in Rodrigues and Taylor (2004).

Let us analyze the asymptotic size and local power of F^{GLS}, F_d^{OLS}, F_i^{OLS} tests with different values of c_1 and c_2 parameters. We consider both the stationary and explosive alternatives for $c_1 = \{-15, -14.75, \ldots, -0.25, 0, 0.1, \ldots, 5.9, 6\}$. The second localizing parameter c_2 is the fraction of c_1, i.e. $c_2 = \gamma c_1$, where $\gamma = \{-1, -0.9, \ldots, -0.1, 0, 0.1, \ldots, 1\}$. Figure 1 shows the size and power of tests for $\gamma > 0$ (i.e. both roots have the same sign), and Figure 2 shows the size and power of tests for $\gamma < 0$ (i.e. both roots have opposite signs). The results were obtained by using simulations of the limiting distributions of the test statistics approximating the functionals of the Ornstein-Uhlenbeck process with discretized Riemann sums with 1,000 steps and 50,000 replications (similar to Haldrup and Lildholdt (2005)). The results show that the power curve of the F^{GLS} is uniformly higher than the power curves of the F_d^{OLS} and F_i^{OLS} everywhere. Also, we obtain the expected result that the power of tests increases with an increasing γ parameter (larger deviation from the null hypothesis). If we compare the F_d^{OLS} and F_i^{OLS} tests, the former slightly outperforms the latter in terms of power, although both tests show non-monotonic power under both the explosive case (for very small c_1) and the stationary alternative when $\gamma < 0$. Also, we observe interesting behavior for the power curve of F^{GLS} test for $\gamma < 0$: with increasing c_2 the power first slightly decreases (although the alternative hypothesis moves away from the null hypothesis), but approximately for $\gamma < -0.3$ the power increases again. Similar behavior is observed for the F_d^{OLS} and F_i^{OLS} tests: e.g. for $\gamma = -0.2$ their power does not exceed 15% for all considered ranges.

4 GLS-based test behavior in finite samples

4.1 The choice of non-centrality parameters for construction of GLS-based test

In this subsection we consider the finite sample behavior of the F^{GLS}, F_d^{OLS} and F_i^{OLS} tests. We note that in the case of the F^{GLS} test, in the construction of the limiting distribution the term $g_{22} \to 1$ in (23). However in finite samples

$$g_{22} = 1 + \frac{(\bar{c}_1 + \bar{c}_2)(\bar{c}_1 + \bar{c}_2 - \bar{c}_1\bar{c}_2) + \bar{c}_1^2\bar{c}_2^2/3}{T} + O\left(\frac{1}{T^2}\right),$$

so that, e.g., for $T = 100$ and $\bar{c}_1 = \bar{c}_2 = -2$ $g_{22} \approx 1.373$, for $\bar{c}_1 = \bar{c}_2 = -4$ $g_{22} \approx 3.773$, for $\bar{c}_1 = 2$, $\bar{c}_2 = \pm 2$ $g_{22} \approx 1.053$, for $\bar{c}_1 = 4$, $\bar{c}_2 = -4$ $g_{22} \approx 1.853$, for $\bar{c}_1 = \bar{c}_2 = 4$ $g_{22} \approx 1.213$. So in many cases the finite sample distribution may be very different from the asymptotic distribution. Thus, a better approximation for the cases being considered can be achieved with $\bar{c}_1 = 2$, $\bar{c}_2 = \pm 2$. Recall that for F^{GLS} the limiting distribution does not depend on $\bar{c}_1$ and $\bar{c}_2$ in contrast, e.g., from the GLS-based unit root test with trend proposed by ERS, the limiting distribution of which depends on $\bar{c}$.

To compare the influence of different values of the $\bar{c}_1$ and $\bar{c}_2$ parameters on finite sample behavior of F^{GLS}, we represent results for $T = 100$ and use finite sample critical values (because for some combinations of $\bar{c}_1$ and $\bar{c}_2$ the finite sample distribution are seriously biased). In Tables 1-11 the size and power values are provided for different combinations of c_1 and c_2 and for different combinations of $\bar{c}_1$ and $\bar{c}_2$. As a comparison, we use the F^0 test, assuming the absence of a deterministic component whose power values should be close to the power values of the F^{GLS} test. We abstract from the effect of serial correlation by generating the errors as $\varepsilon_t \sim i.i.d.N(0,1)$ and by constructing all tests under the assumption of the absence of serial correlation.

For $\bar{c}_1 = \bar{c}_2 = \pm 4, \pm 6$ the power of the F^{GLS} test is considerably lower than the power of the F^0 test except for some cases. Further, first consider the case of $\gamma > 0$. For $\bar{c}_1 = \bar{c}_2 = -2$ the power of the F^{GLS} is close to the power of the F^0 under stationary alternative, but sufficiently far away under explosive alternative. For small γ the power of F^{GLS} is even slightly higher than F^0. For $\bar{c}_1 = 2$, $\bar{c}_2 = -2$ the power of F^{GLS} is somewhat lower that the power of F^0 under stationary alternative. For $\bar{c}_1 = \bar{c}_2 = 2$ the power of the F^{GLS} is virtually identical in all cases to the power of the F^0 test, so that the detrending with $\bar{c}_1 = \bar{c}_2 = 2$ parameters leads to better results. Now consider the case of $\gamma < 0$. For small γ the results roughly coincide with the case of $\gamma > 0$, however, for moderate γ and for $\bar{c}_1 = \bar{c}_2 = -2$ the power of the F^{GLS} is considerably lower than the power of F^0, not only under the explosive, but also under the stationary alternative. The cases of $\bar{c}_1 = 2$, $\bar{c}_2 = -2$ and $\bar{c}_1 = \bar{c}_2 = 2$ lead to approximately identical power for F^{GLS} and F^0 tests. Thus, considering both the cases of $\gamma > 0$ and $\gamma < 0$, we found that the detrending with $\bar{c}_1 = \bar{c}_2 = 2$ parameters seems to be the most reasonable choice for the construction of the F^{GLS} test. Also we note the fact that the power of the F^{GLS} is considerably higher than the power of the F_d^{OLS} and F_i^{OLS} in all cases.

4.2 Lag length selection

As already noted, for constructing of each tests, F_i^{OLS}, F_d^{OLS} and F^{GLS}, the specification of the lag order k is needed. One way is to select a k that minimizes the value of some information criterion, e.g., AIC or BIC. However, the use of conventional information criteria AIC and BIC with the presence of strongly negative parameter in the MA process leads to underestimating the lag order and, therefore, very often the rejection of the null hypothesis (see the discussion of the simulation results below). Ng and Perron (2001) propose incorporating the additional term in the penalty function that reflects the distance from the unit root null hypothesis. Their modified information criterion is

$$MIC(k) = \ln(\hat{\sigma}_k^2) + \frac{C_T(\tau_T(k) + k)}{T - k_{\max}}, \quad (14)$$

where $\hat{\sigma}_k^2$ is the sum of squared residuals obtained from the regression augmented with k lags, $k_{\max}$ is the maximum value of k considered, $C_T = 2$ for MAIC and $C_T = \ln(T - k_{\max})$ for MBIC, $\tau_T(k)$ is the additional data-dependent term (setting $\tau_T(k) = 0$, we obtain conventional information criteria, AIC and BIC). In the context of model (1)-(2) an empirical measure of the Kulback distance of the estimated model from the true model under the null hypothesis is given by (see Ng and Perron (2001)):

$$\Phi_T(k) = \frac{1}{\hat{\sigma}_k^2} \left(\hat{\beta}(k) - \beta^0(k)\right)' \sum_{t=k_{\max}+1}^{T} X_t X_t' \left(\hat{\beta}(k) - \beta^0(k)\right),$$

where $X_t = (y_{t-1}, \Delta y_{t-1}, \Delta^2 y_{t-1}, \ldots, \Delta^2 y_{t-k})$, $\hat{\beta}(k)$ is the estimated parameter vector of the corresponding coefficients $\beta(k) = [\rho_1, \rho_2, \beta_1, \ldots, \beta_k]'$, β_j, $j = 1, \ldots, k$ is the coefficient of $\Delta^2 y_{t-j}$, and under the null hypothesis the $\beta(k)$ vector is $\beta^0(k) = [0, 0, \beta_1, \ldots, \beta_k]$. By using the asymptotic orthogonality between the stationary and integrated regressors under the null, it can obtain $\Phi_T(k) = \tau_T(k) + \chi_k^2 + o_p(1)$, where

$$\tau_T(k) = \frac{1}{\hat{\sigma}_k^2} \left(\hat{\rho}_1^2 \sum_{t=k_{\max}+1}^{T} y_{t-1}^2 + 2\hat{\rho}_1\hat{\rho}_2 \sum_{t=k_{\max}+1}^{T} y_{t-1}\Delta y_{t-1} + \hat{\rho}_2^2 \sum_{t=k_{\max}+1}^{T} \Delta y_{t-1}^2 \right), \quad (15)$$

and the random value χ_k^2 with k degrees of freedom is asymptotically independent of $\tau_T(k)$. With the presence of a deterministic component in the DGP, the series y_{t-1} and Δy_{t-1} in the expression (15) are replaced by their detrended counterparts (respectively, OLS- and GLS-detrending).

For comparing different information criteria we conduct the Monte-Carlo simulations by using DGP as in (1)-(2) with $T = 100$ and, without loss of generality, set $\mu = \beta = 0$ and zero initial values. We consider several different types of innovations ε_t: either in the form of white noise, $\varepsilon_t = e_t$, or of MA,

$$\varepsilon_t = (1 + \theta_1 L)(1 + \theta_2 L)e_t,$$

or of AR,

$$(1 - \varphi_1 L)(1 - \varphi_2 L)\varepsilon_t = e_t,$$

where $e_t \sim i.i.d.N(0, 1)$. We analyze the following cases:

1. $\theta_1 = \theta_2 = \{-0.8, -0.5, 0.5, 0.8\}$, $\varphi_1 = \varphi_2 = 0$;
2. $\theta_1 = \{-0.8, -0.5, 0.5, 0.8\}$, $\theta_2 = \varphi_1 = \varphi_2 = 0$;
3. $\theta_1 = \theta_2 = 0$, $\varphi_1 = \varphi_2 = \{-0.8, -0.5, 0.5, 0.8\}$;
4. $\theta_1 = \theta_2 = \varphi_2 = 0$, $\varphi_1 = \{-0.8, -0.5, 0.5, 0.8\}$;

together with various combinations of c_1 and c_2: $c_1 = \{5, 3, 2, 1, -5, -10, -15, -20, -30, -40\}$, $c_2 = \gamma c_1$, $\gamma = \{-0.5, 0, 0.5, 1\}$.

Table 12 represents the finite sample size for different information criteria. Also following the approach of Perron and Qu (2007), we analyze the finite sample behavior of the GLS-based test, when the lag length is selected through the modified information criteria with OLS-detrended data (we denote these tests as the MAIC-PQ and MBIC-PQ, respectively). It is evident that with using the AIC and BIC in the presence of a strongly negative parameter in the MA process that all tests have a very large size. Implementation of the modified information criteria solves this problem although the size of tests becomes lower that the nominal one, especially for OLS-based tests. In some cases, the size of tests with the MAIC-PQ and MBIC-PQ is slightly closer to the nominal one than with the MAIC and MBIC, but in the case of AR(1) errors and $\phi_1 = 0.8$ the test is oversized.

In Tables 13-29 we represent the size-adjusted finite sample power under various DGP. In general, the results show a significant superiority for GLS-tests over OLS-tests. Although the power for the procedures MAIC, MBIC, MAIC-PQ and MBIC-PQ may be lower than for the AIC and BIC, it is a necessary trade-off so that the size distortions are not too large in some specific cases. Also note that the power losses in some cases under the alternative, which are very far from the null hypothesis, happen for both OLS- and GLS-based tests, so the use of the MAIC-PQ and MBIC-PQ do not solve this problem. However this problem occurs mostly when c_1 and c_2 are of different signs. Moreover, the MAIC-PQ and MBIC-PQ in some cases may lead to zero power under the explosive alternative and strongly negative MA components.

In general, the use of modified information criteria shows a distinct advantage over the standard AIC and BIC in finite samples.

5 Uncertainty over the initial conditions

In this section, we analyze the behavior of tests with different behavior of the initial conditions. As already mentioned, a test with trend is invariant to the initial conditions under the null hypothesis. However, under the alternative the behavior of the power curves is unknown, and this problem is not investigated in the literature about double unit roots tests.[3] In our paper we replace the Assumption 2 which implies asymptotically negligible initial conditions with the weaker Assumption 3.

Assumption 3 *Under H_c with $c \neq 0$ the initial conditions are generated as*

$$u_0 = \xi_{-1} + \xi_0, \tag{16}$$
$$u_{-1} = \xi_{-1}, \tag{17}$$

where

$$\xi_{-1} = T^{3/2}\alpha_{-1}\omega_\varepsilon, \tag{18}$$
$$\xi_0 = T^{1/2}\alpha_0\omega_\varepsilon, \tag{19}$$

[3] On influence of the initial conditions on power of unit root tests see Elliott (1999), Muller and Elliott (2003), Elliott and Muller (2006), Harvey and Leybourne (2005), Harvey and Leybourne (2006) and Harvey *et al.* (2009).

$\alpha_i \sim IN(\mu_{\alpha,i}\mathbb{I}(\sigma_\alpha^2 = 0), \sigma_\alpha^2)$, $i = -1, 0$, independently of ε_t, $t = 1, \ldots, T$. For $c = 0$, under H_0, the initial conditions can be set to be zero, $u_i = 0$, $i = -1, 0$, without loss of generality, due to the exact similarity of the tests with detrended data to the initial conditions in this case (see Rodrigues and Taylor (2004)).

In Assumption 3 α_0 and α_{-1} control the magnitudes of the initial conditions relative to the innovation long-run variance ω_ε^2. The form given for u_i, $i = -1, 0$, allows the initial conditions to be either random and of $O_p(T^{3/2})$, or fixed and of $O(T^{3/2})$, depending on whether the $\sigma_\alpha^2 > 0$ or $\sigma_\alpha^2 = 0$. Note that both u_0 and u_{-1} have the same stochastic order $T^{3/2}$, although ξ_0 is $O_p(T^{1/2})$ $(O(T^{1/2}))$. We need this assumption in order for the difference $u_0 - u_1 = \xi_0$ to be $O_p(T^{1/2})$ $(O(T^{1/2}))$, which ensures that we obtain a non-degenerate limiting distribution. This representation of the initial conditions provides us the possibility to investigate the influence of the initial condition u_{-1} and the difference between it and u_0; this is sufficient for comparison of the tests. In other words, we can take any pair of u_0 and u_{-1} and based on these values uniquely calculate the pair ξ_0 and ξ_{-1} and the corresponding power curve.

Given Assumptions 3, the following Lemma holds.

Lemma 1 *If u_t is generated as* (2)*, the initial conditions are given as in* (16) *and* (17)*, then under the local alternative* (10)

$$T^{-3/2}[u_t - t(u_0 - u_{-1}) - (2u_{-1} - u_0)] \Rightarrow K_{c_1}(L_{c_2}(r)), \tag{20}$$

where

$$K_{c_1}(L_{c_2}(r)) = \begin{cases} \overline{W}(r), & \text{if } c_1 = c_2 = 0, \\ \alpha_0 \frac{e^{rc_1} - e^{rc_2} - 1}{(c_1 - c_2)} + \alpha_{-1}(e^{rc_1} - 1) + Q_{c_1}(J_{c_2}(r)), & \text{if } c_1 \neq 0, c_2 \neq 0, c_1 \neq c_2, \\ \alpha_0 r(e^{rc} - 1) + \alpha_{-1}(e^{rc} - 1) + Q_c(J_c(r)), & \text{if } c_1 = c_2 = c \neq 0 \end{cases} \tag{21}$$

with $\overline{W}(r) = \int_0^r W(s)ds$.

With this lemma, we can easily show that Proposition 1 under Assumption 3 about the initial conditions is modified as follows.

Proposition 2 *Let y_t be generated as* (1)-(2) *and let Assumptions 1, 2 and 3 holds. Then under H_c in limiting distributions* (11), (12) *and* (13) *$Q_c(J_c(r))$ is replaced by $K_c(L_c(r))$ from Lemma 1, and $J_{c_2}(r)$ in formulas for $Q_{c_1}(J_{c_2}(r))^{d\mu}$ and $Q_{c_1}(J_{c_2}(r))^{d\tau}$ is replaced by $K_{c_2}(r) = \alpha_0(e^{rc_2} - 1) + J_{c_2}(r)$.*

Figures 3-7 show the asymptotic power of the F_i^{OLS}, F_d^{OLS} and F^{GLS} tests at the nominal 0.05 level for the following pairs c_1 and c_2: $(-5, -5)$, $(-5, -2.5)$, $(-10, 0)$, $(1, 1)$, $(2, 2)$, $(1, 3)$, $(2, 0)$, $(-10, 1)$, $(-10, 2)$, $(-8, 2)$, $(-2, 2)$. The initial conditions are set to be fixed, $\alpha_0 = \{-1.2, -1.15, \ldots, 1.2\}$ and $\alpha_{-1} = \{-1, -0.5, -0.3, -0.15, 0\}$. For the positive values of α_{-1} the results are symmetric with respect to α_0. Every set of figures 3-7 corresponds to the specific value of α_{-1}.

First consider the case of stationary alternatives (Figures 1(a)-(c), 2(a)-(c), 3(a)-(c), 4(a)-(c), 5(a)-(c)). It should be noted that for very large initial conditions ($|\alpha_i| > 2$, $i = -1, 0$) all tests have a high power (that increases with an increasing initial condition), although such large initial conditions can not be observed in practice. This effect can be seen in Figure 1(a) for $\alpha_{-1} = -1$ and $\alpha_0 < 0$.[4] For $\alpha_{-1} < -0.3$, the power of the F^{GLS} is very small except for the ranges of positive α_0, when α_{-1} and α_0 somewhat offset each other. When the power of the F^{GLS} approaches $\alpha_{-1} = 0$, it increases significantly for α_0 close to zero, and this test becomes effective across considered ones. However, for large α_0 the power becomes zero. If we compare the F_i^{OLS} and F_d^{OLS} tests, the latter dominates all tests for small α_{-1}. However, when α_{-1} approaches zero, the test is strongly dominated by the F_d^{OLS} test. For small α_{-1} and large α_0, the power of the F_d^{OLS} exceeds the power of the other tests. Also note that for $c_1 = -10$ and $c_2 = 0$ the distributions of tests does not depend on α_{-1} (as can be seen from Lemma 1 and the symmetry of influence c_1 and c_2), so the figures will be the same.

Now consider the explosive alternative (Figures 1(d)-(g), 2(d)-(g), 3(d)-(g), 4(d)-(g), 5(d)-(g)). Here, throughout the F^{GLS} test has higher power and the second after it is the F_d^{OLS} test. Also (this is best seen in the case of $\alpha_{-1} = 0$) the power of all tests increases as α_0 moves away from this value, in which each of the tests has the lowest power. This is consistent with analysis of Harvey and Leybourne (2014). Note that similar to the case of stationary alternatives for $c_1 = 2$ and $c_2 = 0$, the distribution of tests does not depend of α_{-1}.

Finally, Figures 1(h)-(k), 2(h)-(k), 3(h)-(k), 4(h)-(k), 5(h)-(k) show the power of tests when one of the roots relates to the stationary alternative and the second relates to the explosive alternative. In this case it is quite difficult to say which of the alternatives dominates the other in terms of power with increasing initial conditions. In case of $c_1 = -10$, $c_2 = 1$ for small initial conditions the behavior of tests corresponds to the behavior under stationary alternatives. In the remaining cases, the power of all tests is small enough except for the F_i^{OLS} and F_d^{OLS} tests when the initial conditions α_{-1} and α_0 are large in absolute value and have different signs. For slightly larger values of c_2 in respect to c_1 and for large α_{-1} the F^{GLS} test dominates other tests and has a power close to unity. For smaller α_{-1}, the behavior becomes more sophisticated. For $\alpha_{-1} = 0$ the F^{GLS} test is effective only for small α_0, although powers of F_i^{OLS} and F_d^{OLS} does not increases with increasing of α_0 (compare this with the behavior of tests under asymptotically negligible initial conditions, Section 3). But already for $\alpha_{-1} = \pm 0.15$ the F^{GLS} test becomes effective for sufficiently wide range of α_0 values. For greater magnitude of c_2 in respect to c_1, the behavior of the tests becomes similar to their behavior in the explosive alternative.

Thus, neither test is effective for all DGP, and each of the tests is effective in some particular cases. Following the approach of Harvey *et al.* (2009), one can propose the union of rejection decision rule (UR), based on the rejection of at least one of the tests considered:

$$\text{Reject } H_0 \text{ if } \left\{ F^{GLS} > m_\xi cv_\xi^{GLS} \text{ or } F_i^{OLS} > m_\xi cv_\xi^{OLS,i} \text{ or } F_d^{OLS} > m_\xi cv_\xi^{OLS,d} \right\}, \qquad (22)$$

where m_ξ is the scaling constant necessary in order for the asymptotic size to be equal to 0.05,[5] and cv_ξ^{GLS}, $cv_\xi^{OLS,i}$ and $cv_\xi^{OLS,d}$ are corresponding critical values. The limiting distribution for (22) follows directly from Proposition 2 and CMT (continuous mapping theorem). On Figures 3-7 the results for union of rejection test (22) are given. As expected, the power curves of this test lie between the ones for the test used in union, which eliminates large power losses in some cases, and, on the other hand, the power curve of UR is approaching one of the effective tests.

Finite sample results are nearly similar to asymptotic ones and omitted for brevity.

[4] In case of testing the only unit root the GLS-based test of ERS does not have this feature.

[5] The values m_ξ at 0.10, 0.05 and 0.01 significance levels are equal to 1.224, 1.186 and 1.135, respectively.

6 Conclusion

In this paper we proposed the extension of the Hasza and Fuller (1979) test for double unit roots based on GLS-detrending. We considered the asymptotic behavior of this test under local to unity behavior of the autoregressive parameters and compared this test with the tests based on OLS-detrending. We found that the latter in some cases have a non-monotonic power and are strongly dominated by the GLS-based test. In the finite sample, we implemented the extension of the modified information criteria allowing two unit roots. This extension prevents the too frequent rejection of the null hypothesis for strongly negative MA-components. We also analyzed another problem devoted to the influence of initial conditions on the power of the test, which is widely studied for the unit root tests. However the power curve behavior becomes more complex than in the case of a single unit root. We proposed the union of the rejection testing strategy of three tests as none is effective for all cases. The extensions we obtained significantly outperform existing tests, so they can be useful in empirical applications (including in the context of cointegration analysis, where it is necessary to know the order of integration of all series).

Appendix

Proof of Proposition 1: Without loss of generality, we set $\mu = \beta = 0$. Also for simplicity, we suppose that $\bar{c}_1 = \bar{c}_2 = \bar{c}$. For $\bar{c}_1 \neq \bar{c}_2$ the analysis is complicated by keeping the main results (the proof for different $\bar{c}_1$ and $\bar{c}_2$ available on request).

Consider (quasi) GLS-estimators $\tilde{\mu}$ and $\tilde{\beta}$:

$$\begin{bmatrix} \tilde{\mu} \\ \tilde{\beta} \end{bmatrix} = \begin{bmatrix} g_{11} & g_{12} \\ g_{12} & g_{22} \end{bmatrix}^{-1} \begin{bmatrix} h_1 \\ h_2 \end{bmatrix}, \tag{23}$$

where

$$\begin{aligned}
g_{11} &= 1 + (1-\phi_1^{\mathbf{c}})^2 + (1-\phi_1^{\mathbf{c}}-\phi_2^{\mathbf{c}})(T-2), \\
g_{12} &= 1 + (1-\phi_1^{\mathbf{c}})(2-\phi_1^{\mathbf{c}}) + (1-\phi_1^{\mathbf{c}}-\phi_2^{\mathbf{c}}) \sum_{t=1}^{T} \{t - \phi_1^{\mathbf{c}}(t-1) - \phi_2^{\mathbf{c}}(t-2)\}, \\
g_{22} &= 1 + (2-\phi_1^{\mathbf{c}})(2-\phi_1^{\mathbf{c}}) + \sum_{t=1}^{T} \{t - \phi_1^{\mathbf{c}}(t-1) - \phi_2^{\mathbf{c}}(t-2)\}^2, \\
h_1 &= y_{-1} + (1-\phi_1^{\mathbf{c}})y_0 + (1-\phi_1^{\mathbf{c}}-\phi_2^{\mathbf{c}}) \sum_{t=1}^{T} (y_t - \phi_1^{\mathbf{c}} y_{t-1} - \phi_2^{\mathbf{c}} y_{t-2}), \\
h_2 &= y_{-1} + (2-\phi_1^{\mathbf{c}})(y_0 - \phi_1^{\mathbf{c}} y_{-1}) + \sum_{t=1}^{T} \{t - \phi_1^{\mathbf{c}}(t-1) - \phi_2^{\mathbf{c}}(t-2)\}(y_t - \phi_1^{\mathbf{c}} y_{t-1} - \phi_2^{\mathbf{c}} y_{t-2}), \\
\phi_1^{\mathbf{c}} &= 2\left(1 + \frac{\bar{c}}{T}\right),\ \phi_2^{\mathbf{c}} = -\left(1 + \frac{\bar{c}}{T}\right)^2.
\end{aligned}$$

The limits included in 2×2 matrix are the following: $g_{11} \to 2$, $g_{12} \to 1$, $g_{22} \to 1$. For 2×1

vector the corresponding elements are rewritten as:

$$
\begin{aligned}
h_1 &= 3y_{-1} - y_0 + \frac{2\bar{c}}{T}(3y_{-1} - y_0) + \frac{4\bar{c}^2}{T^2} y_1 + \frac{\bar{c}^2}{T^2} \sum_{t=1}^{T} \Delta^2 y_t + \frac{2\bar{c}^3}{T^3} \sum_{t=1}^{T} \Delta y_{t-1} + \frac{\bar{c}^4}{T^4} \sum_{t=1}^{T} y_{t-2}, \\
h_2 &= y_{-1} + \frac{2\bar{c}}{T}(2y_{-1} - y_0) + \frac{4\bar{c}^2}{T^2} y_1 - \frac{2\bar{c}}{T} \sum_{t=1}^{T} \Delta^2 y_t - \frac{2\bar{c}^2}{T^2} \sum_{t=1}^{T} y_t + \frac{8\bar{c}^2}{T^2} \sum_{t=1}^{T} y_{t-1} \\
&\quad - \frac{6\bar{c}^2}{T^2} \sum_{t=1}^{T} y_{t-2} + \frac{\bar{c}^2}{T^2} \sum_{t=1}^{T} t y_t - \frac{2\bar{c}^2}{T^2} \sum_{t=1}^{T} t y_{t-1} + \frac{\bar{c}^2}{T^2} \sum_{t=1}^{T} t y_{t-2} + \frac{4\bar{c}^3}{T^3} \sum_{t=1}^{T} y_{t-1} \\
&\quad - \frac{6\bar{c}^3}{T^3} \sum_{t=1}^{T} y_{t-2} - \frac{2\bar{c}^3}{T^3} \sum_{t=1}^{T} t y_{t-1} + \frac{2\bar{c}^3}{T^3} \sum_{t=1}^{T} t y_{t-2} \\
&\quad - \frac{2\bar{c}^4}{T^4} \sum_{t=1}^{T} y_{t-2} + \frac{\bar{c}^4}{T^4} \sum_{t=1}^{T} t y_{t-2}.
\end{aligned}
$$

Thus,

$$
\begin{bmatrix} g_{11} & g_{12} \\ g_{12} & g_{22} \end{bmatrix}^{-1} \to \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}^{-1} = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix},
$$

so that

$$
\begin{aligned}
\begin{bmatrix} T^{-3/2}\tilde{\mu} \\ T^{-1/2}\tilde{\beta} \end{bmatrix} &= \begin{bmatrix} T^{-3/2} & 0 \\ 0 & T^{-1/2} \end{bmatrix} \begin{bmatrix} g_{11} & g_{12} \\ g_{12} & g_{22} \end{bmatrix}^{-1} \begin{bmatrix} h_1 \\ h_2 \end{bmatrix} \\
&= \begin{bmatrix} h_1 - h_2 \\ 2h_2 - h_1 \end{bmatrix} = \begin{bmatrix} o_p(1) \\ o_p(1) \end{bmatrix}.
\end{aligned}
$$

The last equality follows from Assumptions 2 about $u_{-1} = o_p(T^{3/2})$, $u_0 = o_p(T^{3/2})$ and $u_0 - u_1 = o_p(T^{1/2})$.

We obtain the limit of $T^{-3/2}\tilde{u}_{\lfloor rT \rfloor}$ as

$$
\begin{aligned}
T^{-3/2}\tilde{u}_{\lfloor rT \rfloor} &= T^{-3/2} y_{\lfloor rT \rfloor} - T^{-3/2}\tilde{\mu} - T^{-3/2}\tilde{\beta} \lfloor rT \rfloor \\
&= T^{-3/2} y_{\lfloor rT \rfloor} - (2u_{-1} - u_0) - (u_0 - u_{-1}) \lfloor rT \rfloor \\
&= T^{-3/2} u_{\lfloor rT \rfloor} + o_p(1) \\
&\Rightarrow Q_{c_1}(J_{c_2}(r)).
\end{aligned} \tag{24}
$$

The rest of the proof coincides with the proof in Haldrup and Lildholdt (2005) (with the absence of a deterministic component) due to the asymptotic equivalence of $T^{-3/2}\tilde{u}_{\lfloor rT \rfloor}$ and $T^{-3/2}u_{\lfloor rT \rfloor}$.

Proof of Lemma 1: Process u_t in (1) and (2) can be written as

$$
u_t = \sum_{k=1}^{t} \phi_1^{t-k} \sum_{j=1}^{k} \phi_2^{k-j} \varepsilon_j + (u_0 - \phi_1 u_{-1}) \sum_{j=1}^{t} \phi_1^{t-j} \phi_2^j + \phi_1^t u_0. \tag{25}
$$

Then the result of Lemma 1 follows from

$$T^{-3/2}\sum_{k=1}^{t}\phi_1^{t-k}\sum_{j=1}^{k}\phi_2^{k-j}\varepsilon_j \Rightarrow Q_{c_1}(J_{c_2}(r))$$

(by Nabeya and Perron (1994)), and also from

$$\sum_{j=1}^{t}\phi_1^{t-j}\phi_2^{j} \quad = \quad \phi_1^t\sum_{j=1}^{t}(\phi_2/\phi_1)^j \quad = \quad \begin{cases} T\left(1+\frac{c_2}{T}\right)\dfrac{\left(1+\frac{c_1}{T}\right)^t-\left(1+\frac{c_2}{T}\right)^t}{c_1-c_2} & \text{if } c_1\neq c_2,\\ t\left(1+\frac{c_1}{T}\right) & \text{if } c_1=c_2.\end{cases}$$

Note that the process u_t in (25) can be rewritten in the equivalent form as

$$u_t=\sum_{k=1}^{t}\phi_1^{t-k}\sum_{j=1}^{k}\phi_2^{k-j}\varepsilon_j+(u_0-\phi_2u_{-1})\sum_{j=1}^{t}\phi_2^{t-j}\phi_1^{j}+\phi_2^tu_0. \tag{26}$$

In this representation the limit of the sum $\sum_{j=1}^{t}\phi_2^{t-j}\phi_1^j$ is the same as $\sum_{j=1}^{t}\phi_1^{t-j}\phi_2^j$, so that for $c_1\neq 0, c_2\neq 0, c_1\neq c_2$:

$$K_{c_1}(L_{c_2}(r))=\alpha_0\frac{e^{rc_1}-e^{rc_2}-1}{(c_1-c_2)}+\alpha_{-1}(e^{rc_1}-1)+Q_{c_1}(J_{c_2}(r))=\alpha_0\frac{e^{rc_1}-e^{rc_2}-1}{(c_1-c_2)}+\alpha_{-1}(e^{rc_2}-1)+Q_{c_1}(J_{c_2}(r)), \tag{27}$$

which shows the symmetry of the influence of c_1 and c_2 in limiting distributions under asymptotically non-negligible initial conditions.

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Table 1. Size and power of tests, $c_2 = 0$

c_1	F^0	F^{GLS}									F_d^{OLS}	F_i^{OLS}
		$\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$		
-15	0.75	0.80	0.76	0.66	0.76	0.72	0.66	0.76	0.74	0.65	0.35	0.31
-14	0.69	0.75	0.71	0.61	0.70	0.67	0.61	0.70	0.69	0.60	0.31	0.28
-13	0.63	0.70	0.66	0.55	0.63	0.61	0.56	0.63	0.62	0.54	0.28	0.25
-12	0.56	0.63	0.60	0.50	0.57	0.55	0.51	0.57	0.56	0.48	0.25	0.22
-11	0.49	0.57	0.54	0.45	0.50	0.50	0.46	0.51	0.50	0.44	0.22	0.19
-10	0.43	0.50	0.48	0.40	0.43	0.44	0.41	0.43	0.43	0.38	0.19	0.17
-9	0.36	0.42	0.42	0.34	0.37	0.38	0.36	0.37	0.36	0.33	0.16	0.15
-8	0.30	0.36	0.36	0.30	0.31	0.32	0.31	0.31	0.31	0.28	0.14	0.13
-7	0.25	0.30	0.31	0.26	0.25	0.27	0.27	0.25	0.25	0.24	0.12	0.11
-6	0.20	0.24	0.25	0.21	0.20	0.22	0.23	0.20	0.20	0.20	0.11	0.09
-5	0.15	0.19	0.21	0.18	0.16	0.18	0.19	0.16	0.16	0.16	0.09	0.09
-4	0.12	0.15	0.17	0.15	0.13	0.14	0.16	0.13	0.13	0.13	0.08	0.08
-3	0.09	0.11	0.13	0.12	0.10	0.11	0.13	0.10	0.10	0.10	0.07	0.07
-2	0.07	0.09	0.10	0.09	0.07	0.08	0.10	0.07	0.08	0.08	0.06	0.06
-1	0.05	0.06	0.07	0.07	0.06	0.06	0.07	0.06	0.06	0.06	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.06	0.04	0.04	0.04	0.07	0.05	0.04	0.07	0.07	0.05	0.04	0.05
1	0.13	0.05	0.04	0.03	0.13	0.08	0.04	0.13	0.13	0.09	0.03	0.04
1.5	0.28	0.09	0.04	0.03	0.28	0.19	0.08	0.28	0.27	0.21	0.02	0.03
2	0.47	0.25	0.06	0.04	0.47	0.40	0.23	0.47	0.47	0.41	0.02	0.02
2.5	0.65	0.49	0.22	0.15	0.64	0.60	0.48	0.64	0.64	0.61	0.13	0.03
3	0.77	0.68	0.53	0.46	0.78	0.75	0.68	0.78	0.77	0.76	0.42	0.10
3.5	0.86	0.80	0.74	0.71	0.86	0.85	0.81	0.86	0.86	0.85	0.65	0.34
4	0.91	0.88	0.85	0.84	0.91	0.90	0.88	0.91	0.91	0.90	0.79	0.59
4.5	0.94	0.93	0.91	0.90	0.94	0.94	0.93	0.94	0.94	0.94	0.88	0.76
5	0.96	0.95	0.95	0.94	0.97	0.96	0.96	0.96	0.96	0.96	0.93	0.86
5.5	0.98	0.97	0.97	0.96	0.98	0.98	0.97	0.98	0.98	0.98	0.95	0.92
6	0.98	0.98	0.98	0.98	0.99	0.99	0.98	0.99	0.98	0.98	0.97	0.95

Table 2. Size and power of tests, $c_2 = \gamma c_1$

	$\gamma = 0.1$												$\gamma = 0.2$											
c_1	F^0	F^{GLS}									F_d^{OLS}	F_i^{OLS}	F^0	F^{GLS}									F_d^{OLS}	F_i^{OLS}
		$\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$				$\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$		
-15	0.88	0.89	0.81	0.70	0.87	0.77	0.70	0.89	0.83	0.69	0.38	0.34	0.96	0.95	0.88	0.78	0.93	0.82	0.77	0.96	0.89	0.76	0.44	0.38
-14	0.83	0.85	0.76	0.65	0.82	0.72	0.65	0.84	0.78	0.64	0.33	0.30	0.93	0.92	0.83	0.73	0.90	0.78	0.72	0.93	0.85	0.70	0.39	0.33
-13	0.77	0.80	0.71	0.59	0.76	0.67	0.60	0.78	0.72	0.58	0.30	0.26	0.88	0.88	0.78	0.66	0.86	0.73	0.66	0.88	0.80	0.64	0.34	0.29
-12	0.70	0.74	0.64	0.53	0.70	0.61	0.54	0.71	0.66	0.52	0.26	0.23	0.82	0.83	0.72	0.60	0.80	0.67	0.60	0.83	0.74	0.58	0.29	0.25
-11	0.62	0.67	0.58	0.47	0.62	0.56	0.49	0.63	0.59	0.46	0.23	0.20	0.74	0.76	0.65	0.53	0.73	0.61	0.53	0.75	0.67	0.51	0.25	0.22
-10	0.54	0.59	0.52	0.42	0.54	0.49	0.43	0.55	0.51	0.41	0.20	0.18	0.65	0.68	0.58	0.46	0.65	0.55	0.47	0.66	0.59	0.45	0.21	0.19
-9	0.45	0.51	0.46	0.36	0.46	0.44	0.39	0.46	0.44	0.36	0.17	0.15	0.56	0.60	0.51	0.40	0.55	0.48	0.42	0.57	0.51	0.39	0.18	0.16
-8	0.38	0.43	0.40	0.31	0.39	0.37	0.34	0.39	0.37	0.31	0.15	0.13	0.46	0.51	0.43	0.34	0.46	0.42	0.36	0.47	0.43	0.33	0.16	0.14
-7	0.30	0.35	0.34	0.27	0.30	0.31	0.29	0.31	0.30	0.26	0.13	0.12	0.37	0.42	0.37	0.29	0.37	0.35	0.31	0.37	0.35	0.28	0.13	0.12
-6	0.24	0.29	0.28	0.22	0.24	0.26	0.25	0.24	0.24	0.22	0.11	0.10	0.28	0.33	0.31	0.24	0.29	0.29	0.26	0.29	0.28	0.23	0.11	0.10
-5	0.18	0.22	0.23	0.19	0.19	0.21	0.21	0.19	0.19	0.18	0.09	0.08	0.21	0.26	0.25	0.20	0.22	0.23	0.22	0.22	0.22	0.19	0.10	0.09
-4	0.13	0.17	0.18	0.15	0.14	0.16	0.17	0.14	0.14	0.14	0.08	0.08	0.16	0.19	0.20	0.16	0.16	0.18	0.18	0.16	0.16	0.15	0.08	0.08
-3	0.10	0.13	0.14	0.13	0.11	0.12	0.14	0.11	0.11	0.11	0.07	0.07	0.11	0.14	0.15	0.13	0.11	0.13	0.15	0.11	0.12	0.12	0.07	0.07
-2	0.08	0.09	0.11	0.10	0.08	0.09	0.10	0.08	0.08	0.09	0.06	0.06	0.08	0.10	0.11	0.10	0.08	0.10	0.11	0.08	0.08	0.09	0.06	0.06
-1	0.06	0.07	0.07	0.07	0.06	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.08	0.08	0.06	0.07	0.08	0.06	0.06	0.07	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.07	0.05	0.04	0.04	0.07	0.05	0.04	0.07	0.07	0.05	0.04	0.05	0.07	0.05	0.04	0.04	0.07	0.05	0.04	0.07	0.07	0.05	0.04	0.04
1	0.15	0.05	0.04	0.03	0.15	0.09	0.04	0.15	0.14	0.10	0.03	0.04	0.16	0.06	0.04	0.03	0.16	0.10	0.05	0.17	0.16	0.11	0.03	0.04
1.5	0.31	0.11	0.04	0.03	0.31	0.21	0.09	0.31	0.31	0.24	0.02	0.03	0.34	0.13	0.04	0.03	0.34	0.25	0.11	0.34	0.34	0.27	0.02	0.03
2	0.51	0.29	0.08	0.05	0.50	0.43	0.27	0.51	0.50	0.45	0.03	0.02	0.54	0.34	0.10	0.07	0.54	0.47	0.32	0.54	0.54	0.49	0.04	0.02
2.5	0.68	0.53	0.28	0.19	0.67	0.63	0.52	0.67	0.67	0.64	0.18	0.03	0.70	0.57	0.34	0.25	0.71	0.67	0.57	0.70	0.70	0.67	0.24	0.03
3	0.79	0.71	0.58	0.52	0.80	0.78	0.71	0.79	0.79	0.78	0.47	0.13	0.81	0.74	0.63	0.57	0.82	0.79	0.74	0.81	0.81	0.80	0.52	0.17
3.5	0.87	0.82	0.77	0.74	0.87	0.86	0.83	0.87	0.87	0.86	0.69	0.39	0.88	0.84	0.79	0.77	0.88	0.87	0.84	0.88	0.88	0.87	0.72	0.43
4	0.92	0.89	0.87	0.85	0.92	0.91	0.89	0.92	0.92	0.91	0.81	0.62	0.93	0.90	0.88	0.87	0.93	0.92	0.90	0.93	0.93	0.92	0.84	0.66
4.5	0.95	0.93	0.92	0.91	0.95	0.95	0.94	0.95	0.95	0.95	0.89	0.78	0.95	0.94	0.93	0.92	0.95	0.95	0.94	0.95	0.95	0.95	0.90	0.80
5	0.97	0.96	0.95	0.95	0.97	0.97	0.96	0.97	0.97	0.97	0.93	0.87	0.97	0.96	0.96	0.95	0.97	0.97	0.96	0.97	0.97	0.97	0.94	0.89
5.5	0.98	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.96	0.92	0.98	0.98	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.96	0.93
6	0.99	0.98	0.98	0.98	0.99	0.99	0.98	0.99	0.99	0.99	0.97	0.95	0.99	0.99	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.96

Table 3. Size and power of tests, $c_2 = \gamma c_1$

	$\gamma = 0.3$												$\gamma = 0.4$											
c_1	F^0	F^{GLS}									F_d^{OLS}	F_i^{OLS}	F^0	F^{GLS}									F_d^{OLS}	F_i^{OLS}
		$\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$				$\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$		
-15	0.99	0.98	0.93	0.87	0.96	0.87	0.83	0.99	0.94	0.82	0.52	0.43	1.00	0.99	0.96	0.92	0.98	0.91	0.89	1.00	0.97	0.88	0.61	0.50
-14	0.97	0.96	0.90	0.81	0.94	0.83	0.79	0.97	0.90	0.77	0.46	0.38	0.99	0.98	0.94	0.88	0.97	0.88	0.85	0.99	0.94	0.83	0.54	0.44
-13	0.95	0.93	0.85	0.74	0.91	0.79	0.73	0.95	0.86	0.71	0.40	0.33	0.98	0.97	0.90	0.82	0.95	0.84	0.80	0.98	0.91	0.78	0.47	0.38
-12	0.90	0.89	0.79	0.67	0.87	0.73	0.67	0.91	0.81	0.64	0.34	0.28	0.95	0.94	0.86	0.75	0.92	0.79	0.73	0.96	0.87	0.71	0.41	0.33
-11	0.84	0.84	0.72	0.60	0.81	0.67	0.60	0.85	0.75	0.57	0.29	0.24	0.91	0.90	0.79	0.67	0.87	0.72	0.66	0.92	0.81	0.63	0.34	0.28
-10	0.75	0.76	0.64	0.52	0.74	0.60	0.52	0.76	0.67	0.49	0.24	0.20	0.84	0.83	0.71	0.59	0.81	0.66	0.59	0.85	0.74	0.55	0.28	0.23
-9	0.65	0.68	0.56	0.45	0.65	0.53	0.46	0.67	0.58	0.43	0.21	0.18	0.75	0.75	0.63	0.50	0.73	0.59	0.51	0.76	0.65	0.48	0.23	0.20
-8	0.55	0.58	0.48	0.38	0.55	0.46	0.39	0.56	0.50	0.36	0.18	0.15	0.64	0.65	0.53	0.42	0.62	0.50	0.43	0.64	0.56	0.40	0.19	0.16
-7	0.44	0.48	0.41	0.31	0.44	0.39	0.33	0.45	0.41	0.31	0.14	0.13	0.51	0.54	0.45	0.34	0.51	0.43	0.37	0.52	0.46	0.34	0.16	0.14
-6	0.33	0.38	0.33	0.26	0.34	0.32	0.28	0.34	0.32	0.25	0.12	0.11	0.39	0.43	0.37	0.28	0.40	0.35	0.30	0.40	0.37	0.27	0.13	0.11
-5	0.25	0.29	0.27	0.21	0.26	0.26	0.23	0.26	0.25	0.20	0.10	0.09	0.29	0.33	0.30	0.23	0.29	0.28	0.25	0.29	0.28	0.22	0.11	0.10
-4	0.18	0.22	0.21	0.17	0.18	0.20	0.19	0.18	0.18	0.16	0.08	0.08	0.20	0.25	0.23	0.19	0.20	0.22	0.20	0.20	0.20	0.17	0.09	0.08
-3	0.12	0.15	0.16	0.14	0.13	0.15	0.15	0.13	0.13	0.13	0.07	0.07	0.14	0.17	0.18	0.15	0.14	0.16	0.16	0.14	0.14	0.13	0.07	0.07
-2	0.09	0.11	0.12	0.11	0.09	0.10	0.12	0.09	0.09	0.10	0.07	0.06	0.09	0.11	0.13	0.11	0.10	0.11	0.12	0.10	0.10	0.10	0.06	0.06
-1	0.06	0.07	0.08	0.08	0.06	0.07	0.08	0.06	0.06	0.07	0.06	0.06	0.06	0.07	0.08	0.08	0.06	0.07	0.08	0.06	0.07	0.07	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.08	0.05	0.04	0.04	0.07	0.05	0.04	0.08	0.07	0.06	0.04	0.05	0.08	0.05	0.04	0.04	0.08	0.06	0.04	0.08	0.08	0.06	0.04	0.04
1	0.19	0.06	0.04	0.03	0.18	0.11	0.05	0.19	0.18	0.13	0.03	0.04	0.21	0.07	0.03	0.03	0.20	0.12	0.05	0.21	0.20	0.14	0.03	0.04
1.5	0.38	0.16	0.05	0.04	0.38	0.29	0.14	0.38	0.38	0.31	0.02	0.03	0.41	0.19	0.05	0.04	0.42	0.32	0.17	0.42	0.41	0.35	0.02	0.03
2	0.58	0.39	0.13	0.08	0.58	0.51	0.37	0.58	0.58	0.53	0.05	0.02	0.62	0.44	0.17	0.11	0.62	0.56	0.42	0.62	0.61	0.57	0.09	0.02
2.5	0.73	0.62	0.41	0.31	0.73	0.70	0.61	0.73	0.73	0.70	0.30	0.04	0.76	0.65	0.47	0.39	0.76	0.73	0.65	0.76	0.76	0.73	0.36	0.06
3	0.83	0.77	0.67	0.63	0.83	0.82	0.77	0.83	0.83	0.82	0.58	0.21	0.85	0.80	0.72	0.67	0.86	0.84	0.80	0.85	0.85	0.84	0.63	0.27
3.5	0.89	0.86	0.81	0.79	0.90	0.89	0.86	0.90	0.89	0.89	0.75	0.49	0.91	0.88	0.84	0.82	0.91	0.90	0.88	0.91	0.91	0.90	0.78	0.54
4	0.94	0.91	0.89	0.88	0.94	0.93	0.91	0.93	0.93	0.93	0.85	0.70	0.94	0.93	0.91	0.90	0.94	0.94	0.92	0.94	0.94	0.94	0.87	0.74
4.5	0.96	0.95	0.94	0.93	0.96	0.96	0.95	0.96	0.96	0.96	0.91	0.83	0.96	0.95	0.94	0.94	0.97	0.96	0.96	0.97	0.96	0.96	0.92	0.85
5	0.97	0.97	0.96	0.96	0.98	0.97	0.97	0.98	0.97	0.97	0.95	0.90	0.98	0.97	0.97	0.96	0.98	0.98	0.97	0.98	0.98	0.98	0.95	0.91
5.5	0.98	0.98	0.98	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.94	0.99	0.98	0.98	0.98	0.99	0.98	0.98	0.99	0.98	0.98	0.97	0.95
6	0.99	0.99	0.99	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.97	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.97

Table 4. Size and power of tests, $c_2 = \gamma c_1$

$\gamma = 0.5$

c_1	F^0	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	1.00	0.99	0.98	0.96	0.99	0.94	0.92	1.00	0.98	0.92	0.69	0.58
-14	1.00	0.99	0.97	0.93	0.98	0.91	0.89	1.00	0.97	0.89	0.62	0.51
-13	0.99	0.98	0.94	0.89	0.97	0.88	0.85	0.99	0.94	0.84	0.54	0.44
-12	0.98	0.97	0.91	0.82	0.94	0.83	0.79	0.98	0.91	0.77	0.46	0.37
-11	0.95	0.94	0.85	0.74	0.91	0.77	0.72	0.96	0.86	0.69	0.40	0.32
-10	0.91	0.89	0.77	0.66	0.86	0.71	0.65	0.91	0.80	0.62	0.33	0.27
-9	0.83	0.82	0.69	0.56	0.79	0.63	0.56	0.83	0.71	0.53	0.26	0.21
-8	0.72	0.72	0.59	0.47	0.69	0.55	0.48	0.73	0.62	0.45	0.22	0.18
-7	0.58	0.61	0.49	0.38	0.58	0.47	0.40	0.60	0.51	0.37	0.17	0.15
-6	0.45	0.49	0.41	0.31	0.45	0.39	0.33	0.46	0.41	0.30	0.14	0.12
-5	0.33	0.37	0.32	0.24	0.33	0.31	0.26	0.33	0.31	0.23	0.11	0.10
-4	0.23	0.27	0.25	0.19	0.23	0.24	0.21	0.23	0.23	0.19	0.09	0.08
-3	0.15	0.19	0.19	0.15	0.15	0.17	0.17	0.15	0.16	0.14	0.07	0.07
-2	0.10	0.12	0.13	0.12	0.10	0.12	0.13	0.10	0.10	0.10	0.07	0.06
-1	0.06	0.08	0.09	0.08	0.07	0.07	0.08	0.07	0.07	0.07	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.08	0.05	0.04	0.04	0.08	0.06	0.04	0.08	0.08	0.06	0.04	0.04
1	0.23	0.07	0.04	0.03	0.23	0.14	0.06	0.23	0.23	0.17	0.02	0.03
1.5	0.46	0.23	0.06	0.04	0.45	0.36	0.20	0.45	0.45	0.39	0.02	0.02
2	0.65	0.50	0.22	0.15	0.65	0.60	0.48	0.65	0.65	0.61	0.13	0.02
2.5	0.79	0.70	0.54	0.46	0.79	0.76	0.69	0.79	0.78	0.76	0.44	0.09
3	0.87	0.82	0.75	0.72	0.87	0.85	0.82	0.87	0.87	0.86	0.68	0.34
3.5	0.92	0.89	0.86	0.85	0.92	0.91	0.89	0.92	0.92	0.91	0.82	0.61
4	0.95	0.93	0.92	0.91	0.95	0.95	0.94	0.95	0.95	0.95	0.89	0.78
4.5	0.97	0.96	0.95	0.95	0.97	0.97	0.96	0.97	0.97	0.97	0.94	0.87
5	0.98	0.98	0.97	0.97	0.98	0.98	0.97	0.98	0.98	0.98	0.96	0.93
5.5	0.99	0.98	0.98	0.98	0.99	0.99	0.98	0.99	0.99	0.99	0.97	0.96
6	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.98

$\gamma = 0.6$

c_1	F^0	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	1.00	1.00	0.99	0.98	0.99	0.96	0.95	1.00	0.99	0.95	0.77	0.66
-14	1.00	1.00	0.98	0.96	0.99	0.93	0.92	1.00	0.98	0.92	0.69	0.58
-13	1.00	0.99	0.97	0.93	0.98	0.91	0.89	1.00	0.97	0.88	0.61	0.50
-12	0.99	0.98	0.94	0.88	0.96	0.87	0.84	0.99	0.94	0.83	0.53	0.43
-11	0.98	0.96	0.90	0.81	0.94	0.82	0.78	0.98	0.90	0.75	0.45	0.36
-10	0.95	0.93	0.83	0.72	0.90	0.76	0.70	0.95	0.84	0.67	0.37	0.30
-9	0.88	0.86	0.74	0.62	0.85	0.68	0.62	0.89	0.77	0.58	0.30	0.24
-8	0.78	0.78	0.64	0.52	0.75	0.60	0.53	0.79	0.67	0.49	0.24	0.19
-7	0.66	0.67	0.54	0.43	0.64	0.51	0.44	0.67	0.57	0.41	0.19	0.16
-6	0.51	0.54	0.44	0.34	0.51	0.42	0.35	0.52	0.45	0.33	0.15	0.13
-5	0.37	0.41	0.35	0.27	0.38	0.33	0.29	0.38	0.34	0.26	0.12	0.11
-4	0.26	0.30	0.27	0.20	0.26	0.25	0.23	0.26	0.25	0.20	0.09	0.09
-3	0.17	0.20	0.20	0.16	0.17	0.19	0.18	0.17	0.17	0.15	0.08	0.07
-2	0.10	0.13	0.14	0.12	0.11	0.12	0.13	0.11	0.11	0.11	0.07	0.07
-1	0.07	0.08	0.09	0.08	0.07	0.08	0.09	0.07	0.07	0.08	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.09	0.05	0.04	0.03	0.09	0.06	0.04	0.09	0.09	0.06	0.04	0.04
1	0.25	0.08	0.04	0.03	0.25	0.16	0.07	0.25	0.25	0.19	0.02	0.03
1.5	0.49	0.27	0.08	0.05	0.48	0.40	0.24	0.48	0.48	0.42	0.03	0.02
2	0.68	0.54	0.28	0.20	0.68	0.64	0.53	0.68	0.68	0.65	0.18	0.02
2.5	0.81	0.74	0.60	0.54	0.81	0.79	0.73	0.81	0.81	0.79	0.50	0.12
3	0.88	0.84	0.79	0.76	0.89	0.88	0.84	0.89	0.89	0.88	0.72	0.41
3.5	0.93	0.91	0.88	0.87	0.93	0.92	0.91	0.93	0.93	0.92	0.84	0.66
4	0.96	0.95	0.93	0.93	0.96	0.95	0.94	0.96	0.96	0.95	0.91	0.81
4.5	0.97	0.97	0.96	0.96	0.98	0.97	0.97	0.98	0.98	0.97	0.95	0.89
5	0.99	0.98	0.98	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.94
5.5	0.99	0.99	0.99	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.97
6	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98

Table 5. Size and power of tests, $c_2 = \gamma c_1$

	$\gamma = 0.7$												$\gamma = 0.8$											
c_1	F^0	F^{GLS}									F_d^{OLS}	F_i^{OLS}	F^0	F^{GLS}									F_d^{OLS}	F_i^{OLS}
		$\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$				$\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$		
-15	1.00	1.00	1.00	0.99	0.99	0.97	0.96	1.00	0.99	0.97	0.83	0.73	1.00	1.00	1.00	1.00	1.00	0.98	0.98	1.00	1.00	0.98	0.89	0.80
-14	1.00	1.00	0.99	0.98	0.99	0.95	0.95	1.00	0.99	0.95	0.76	0.65	1.00	1.00	0.99	0.99	0.99	0.97	0.96	1.00	0.99	0.97	0.83	0.72
-13	1.00	0.99	0.98	0.96	0.98	0.93	0.92	1.00	0.98	0.92	0.69	0.57	1.00	1.00	0.99	0.98	0.99	0.95	0.94	1.00	0.99	0.94	0.75	0.63
-12	1.00	0.99	0.96	0.92	0.98	0.90	0.88	1.00	0.96	0.87	0.60	0.48	1.00	0.99	0.98	0.95	0.98	0.92	0.91	1.00	0.98	0.91	0.66	0.55
-11	0.99	0.98	0.93	0.86	0.96	0.85	0.82	0.99	0.93	0.81	0.51	0.41	1.00	0.99	0.95	0.91	0.97	0.89	0.86	1.00	0.95	0.85	0.57	0.46
-10	0.97	0.95	0.88	0.78	0.93	0.80	0.75	0.97	0.88	0.73	0.42	0.34	0.99	0.97	0.92	0.84	0.95	0.83	0.80	0.98	0.91	0.77	0.47	0.37
-9	0.93	0.91	0.80	0.69	0.88	0.73	0.67	0.93	0.81	0.64	0.34	0.27	0.96	0.94	0.85	0.74	0.91	0.77	0.72	0.96	0.85	0.69	0.39	0.31
-8	0.85	0.83	0.70	0.57	0.81	0.64	0.58	0.85	0.73	0.54	0.27	0.22	0.89	0.87	0.75	0.63	0.85	0.68	0.62	0.90	0.77	0.58	0.30	0.24
-7	0.73	0.73	0.59	0.47	0.70	0.55	0.48	0.73	0.62	0.44	0.21	0.18	0.78	0.78	0.64	0.51	0.75	0.59	0.52	0.79	0.67	0.48	0.24	0.20
-6	0.57	0.60	0.48	0.37	0.56	0.45	0.39	0.58	0.50	0.35	0.17	0.14	0.63	0.64	0.52	0.40	0.61	0.48	0.41	0.64	0.54	0.38	0.18	0.15
-5	0.42	0.45	0.37	0.28	0.42	0.36	0.30	0.43	0.38	0.28	0.13	0.11	0.47	0.50	0.41	0.31	0.46	0.39	0.33	0.47	0.42	0.30	0.14	0.12
-4	0.28	0.32	0.28	0.22	0.29	0.27	0.24	0.29	0.27	0.21	0.10	0.09	0.31	0.36	0.30	0.23	0.32	0.30	0.25	0.32	0.30	0.23	0.10	0.10
-3	0.18	0.22	0.21	0.17	0.19	0.20	0.19	0.19	0.18	0.16	0.08	0.08	0.20	0.23	0.22	0.17	0.21	0.21	0.20	0.21	0.20	0.17	0.08	0.08
-2	0.11	0.14	0.15	0.13	0.11	0.13	0.14	0.11	0.12	0.11	0.07	0.07	0.12	0.15	0.16	0.13	0.12	0.14	0.14	0.12	0.12	0.12	0.07	0.07
-1	0.07	0.08	0.10	0.09	0.07	0.08	0.09	0.07	0.07	0.07	0.06	0.06	0.07	0.09	0.10	0.09	0.07	0.08	0.09	0.07	0.07	0.08	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.09	0.05	0.04	0.04	0.10	0.06	0.04	0.10	0.09	0.07	0.04	0.04	0.10	0.05	0.04	0.03	0.10	0.06	0.04	0.10	0.10	0.07	0.03	0.04
1	0.28	0.10	0.04	0.03	0.28	0.18	0.08	0.28	0.27	0.21	0.02	0.03	0.31	0.11	0.04	0.03	0.30	0.21	0.09	0.31	0.30	0.23	0.02	0.03
1.5	0.52	0.31	0.09	0.06	0.53	0.45	0.29	0.53	0.53	0.47	0.03	0.02	0.56	0.36	0.12	0.08	0.56	0.49	0.34	0.56	0.56	0.51	0.04	0.02
2	0.71	0.59	0.35	0.26	0.72	0.67	0.58	0.72	0.71	0.68	0.25	0.03	0.74	0.63	0.43	0.34	0.75	0.71	0.63	0.75	0.75	0.72	0.32	0.04
2.5	0.83	0.77	0.66	0.61	0.83	0.81	0.76	0.83	0.83	0.81	0.57	0.18	0.85	0.80	0.71	0.67	0.86	0.84	0.80	0.86	0.85	0.84	0.63	0.25
3	0.90	0.87	0.82	0.80	0.90	0.89	0.87	0.90	0.90	0.89	0.76	0.49	0.92	0.89	0.85	0.83	0.92	0.91	0.88	0.92	0.92	0.91	0.80	0.57
3.5	0.94	0.92	0.90	0.89	0.94	0.94	0.92	0.94	0.94	0.94	0.87	0.72	0.95	0.94	0.92	0.91	0.95	0.95	0.93	0.95	0.95	0.95	0.89	0.77
4	0.96	0.95	0.94	0.94	0.96	0.96	0.95	0.96	0.96	0.96	0.92	0.84	0.97	0.96	0.95	0.95	0.97	0.97	0.96	0.97	0.97	0.97	0.94	0.87
4.5	0.98	0.97	0.97	0.96	0.98	0.97	0.97	0.98	0.98	0.97	0.95	0.91	0.98	0.98	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.96	0.93
5	0.99	0.98	0.98	0.98	0.99	0.99	0.98	0.99	0.99	0.99	0.97	0.95	0.99	0.99	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.96
5.5	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.97	0.99	0.99	0.99	0.99	1.00	0.99	0.99	1.00	1.00	0.99	0.99	0.98
6	1.00	0.99	0.99	0.99	1.00	1.00	0.99	1.00	1.00	1.00	0.99	0.98	1.00	1.00	0.99	0.99	1.00	1.00	0.99	1.00	1.00	1.00	0.99	0.99

Table 6. Size and power of tests, $c_2 = \gamma c_1$

$\gamma = 0.9$

c_1	F^0	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -2$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -4$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -6$	F^{GLS} $\bar{c}_1 = 2, \bar{c}_2 = -2$	F^{GLS} $\bar{c}_1 = 4, \bar{c}_2 = -4$	F^{GLS} $\bar{c}_1 = 6, \bar{c}_2 = -6$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 2$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 4$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	1.00	1.00	1.00	1.00	1.00	0.99	0.98	1.00	1.00	0.99	0.93	0.85
-14	1.00	1.00	1.00	1.00	1.00	0.98	0.97	1.00	1.00	0.98	0.88	0.78
-13	1.00	1.00	0.99	0.99	0.99	0.96	0.96	1.00	0.99	0.96	0.81	0.69
-12	1.00	1.00	0.99	0.97	0.99	0.94	0.93	1.00	0.99	0.93	0.73	0.60
-11	1.00	0.99	0.97	0.94	0.98	0.91	0.89	1.00	0.97	0.89	0.64	0.51
-10	0.99	0.98	0.94	0.88	0.96	0.86	0.83	0.99	0.94	0.82	0.53	0.41
-9	0.98	0.96	0.89	0.80	0.93	0.81	0.77	0.97	0.89	0.74	0.43	0.34
-8	0.93	0.91	0.80	0.69	0.88	0.73	0.67	0.93	0.81	0.63	0.34	0.27
-7	0.84	0.82	0.68	0.56	0.79	0.63	0.56	0.84	0.71	0.52	0.26	0.20
-6	0.69	0.69	0.56	0.44	0.66	0.52	0.45	0.70	0.59	0.42	0.20	0.16
-5	0.52	0.54	0.43	0.34	0.50	0.41	0.35	0.52	0.45	0.32	0.15	0.13
-4	0.36	0.39	0.33	0.25	0.35	0.31	0.27	0.35	0.32	0.24	0.11	0.10
-3	0.22	0.26	0.24	0.19	0.22	0.22	0.21	0.22	0.21	0.18	0.09	0.08
-2	0.13	0.16	0.16	0.14	0.13	0.15	0.15	0.13	0.13	0.12	0.07	0.06
-1	0.07	0.09	0.10	0.09	0.07	0.09	0.10	0.07	0.07	0.08	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.11	0.05	0.04	0.04	0.11	0.07	0.04	0.11	0.11	0.07	0.03	0.04
1	0.34	0.13	0.04	0.03	0.34	0.24	0.11	0.34	0.33	0.26	0.02	0.03
1.5	0.60	0.41	0.15	0.10	0.60	0.53	0.39	0.60	0.59	0.55	0.07	0.02
2	0.77	0.68	0.50	0.42	0.77	0.74	0.67	0.78	0.78	0.75	0.40	0.06
2.5	0.87	0.82	0.75	0.72	0.87	0.86	0.82	0.88	0.88	0.86	0.68	0.33
3	0.93	0.90	0.88	0.86	0.93	0.92	0.90	0.93	0.93	0.92	0.84	0.64
3.5	0.96	0.95	0.93	0.93	0.96	0.95	0.94	0.96	0.96	0.95	0.91	0.81
4	0.98	0.97	0.96	0.96	0.98	0.97	0.97	0.98	0.98	0.97	0.95	0.90
4.5	0.99	0.98	0.98	0.98	0.99	0.99	0.98	0.99	0.99	0.98	0.97	0.95
5	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.97
5.5	1.00	1.00	0.99	0.99	1.00	1.00	0.99	1.00	1.00	1.00	0.99	0.98
6	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99

$\gamma = 1$

c_1	F^0	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -2$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -4$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -6$	F^{GLS} $\bar{c}_1 = 2, \bar{c}_2 = -2$	F^{GLS} $\bar{c}_1 = 4, \bar{c}_2 = -4$	F^{GLS} $\bar{c}_1 = 6, \bar{c}_2 = -6$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 2$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 4$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	1.00	1.00	1.00	1.00	1.00	0.99	0.99	1.00	1.00	0.99	0.96	0.90
-14	1.00	1.00	1.00	1.00	1.00	0.98	0.98	1.00	1.00	0.99	0.92	0.83
-13	1.00	1.00	1.00	0.99	1.00	0.97	0.97	1.00	1.00	0.98	0.86	0.75
-12	1.00	1.00	0.99	0.98	0.99	0.96	0.95	1.00	0.99	0.95	0.79	0.66
-11	1.00	0.99	0.98	0.96	0.98	0.93	0.92	1.00	0.98	0.92	0.69	0.56
-10	1.00	0.99	0.96	0.92	0.97	0.89	0.87	1.00	0.96	0.86	0.59	0.46
-9	0.99	0.97	0.91	0.85	0.95	0.83	0.80	0.99	0.92	0.78	0.48	0.37
-8	0.96	0.93	0.84	0.74	0.91	0.76	0.71	0.95	0.85	0.67	0.38	0.29
-7	0.88	0.86	0.73	0.61	0.83	0.67	0.60	0.88	0.75	0.56	0.29	0.23
-6	0.74	0.74	0.60	0.48	0.71	0.55	0.48	0.74	0.62	0.44	0.22	0.17
-5	0.57	0.58	0.46	0.36	0.55	0.44	0.37	0.57	0.49	0.34	0.16	0.13
-4	0.38	0.42	0.34	0.27	0.38	0.33	0.28	0.39	0.35	0.26	0.12	0.10
-3	0.24	0.28	0.25	0.20	0.24	0.24	0.22	0.24	0.23	0.19	0.09	0.08
-2	0.13	0.16	0.17	0.14	0.14	0.15	0.15	0.14	0.14	0.13	0.07	0.07
-1	0.07	0.09	0.10	0.09	0.08	0.09	0.10	0.07	0.08	0.08	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.12	0.05	0.04	0.03	0.12	0.07	0.04	0.12	0.12	0.08	0.03	0.04
1	0.37	0.15	0.05	0.03	0.36	0.27	0.13	0.36	0.36	0.29	0.02	0.03
1.5	0.63	0.46	0.19	0.13	0.63	0.57	0.44	0.63	0.62	0.58	0.10	0.02
2	0.80	0.71	0.57	0.50	0.80	0.77	0.71	0.80	0.80	0.78	0.47	0.09
2.5	0.89	0.85	0.79	0.77	0.89	0.88	0.84	0.89	0.89	0.88	0.73	0.42
3	0.94	0.92	0.90	0.89	0.94	0.93	0.92	0.94	0.94	0.93	0.86	0.70
3.5	0.97	0.96	0.95	0.94	0.97	0.96	0.95	0.97	0.97	0.96	0.93	0.85
4	0.98	0.98	0.97	0.97	0.98	0.98	0.97	0.98	0.98	0.98	0.96	0.92
4.5	0.99	0.99	0.98	0.98	0.99	0.99	0.98	0.99	0.99	0.99	0.98	0.96
5	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98
5.5	1.00	1.00	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99

Table 7. Size and power of tests, $c_2 = -\gamma c_1$

$\gamma = 0.1$

c_1	F^0	F^{GLS}: $\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	0.59	0.66	0.68	0.59	0.59	0.59	0.55	0.60	0.60	0.57	0.33	0.31
-14	0.54	0.61	0.64	0.56	0.54	0.54	0.52	0.55	0.55	0.53	0.30	0.28
-13	0.49	0.57	0.60	0.52	0.49	0.50	0.49	0.49	0.50	0.48	0.27	0.25
-12	0.43	0.51	0.54	0.48	0.43	0.45	0.45	0.44	0.45	0.43	0.24	0.22
-11	0.38	0.46	0.49	0.43	0.38	0.40	0.41	0.39	0.39	0.38	0.22	0.20
-10	0.33	0.40	0.43	0.38	0.33	0.36	0.37	0.33	0.34	0.34	0.19	0.18
-9	0.28	0.34	0.38	0.33	0.28	0.31	0.33	0.29	0.29	0.30	0.17	0.15
-8	0.23	0.29	0.33	0.29	0.24	0.27	0.29	0.24	0.25	0.25	0.15	0.13
-7	0.20	0.25	0.28	0.24	0.20	0.22	0.24	0.20	0.20	0.21	0.13	0.12
-6	0.16	0.20	0.23	0.20	0.16	0.18	0.20	0.16	0.17	0.18	0.11	0.10
-5	0.13	0.16	0.19	0.17	0.13	0.15	0.17	0.14	0.14	0.14	0.09	0.08
-4	0.10	0.13	0.15	0.14	0.11	0.12	0.14	0.11	0.11	0.12	0.08	0.08
-3	0.08	0.10	0.12	0.11	0.09	0.10	0.12	0.09	0.09	0.10	0.07	0.07
-2	0.07	0.08	0.09	0.09	0.07	0.08	0.09	0.07	0.07	0.08	0.06	0.06
-1	0.05	0.06	0.07	0.07	0.06	0.06	0.07	0.06	0.06	0.06	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.06	0.04	0.04	0.04	0.06	0.05	0.04	0.07	0.06	0.05	0.04	0.05
1	0.12	0.05	0.04	0.03	0.12	0.07	0.04	0.12	0.12	0.08	0.04	0.04
1.5	0.25	0.08	0.04	0.03	0.25	0.16	0.06	0.25	0.25	0.18	0.02	0.03
2	0.43	0.21	0.05	0.04	0.43	0.35	0.19	0.43	0.43	0.37	0.02	0.02
2.5	0.62	0.45	0.17	0.11	0.62	0.57	0.44	0.62	0.62	0.58	0.09	0.03
3	0.75	0.65	0.49	0.41	0.76	0.73	0.65	0.76	0.76	0.73	0.37	0.09
3.5	0.84	0.78	0.72	0.68	0.85	0.83	0.79	0.85	0.85	0.84	0.62	0.30
4	0.90	0.87	0.84	0.82	0.91	0.90	0.87	0.90	0.90	0.90	0.77	0.55
4.5	0.94	0.92	0.90	0.90	0.94	0.94	0.92	0.94	0.94	0.94	0.86	0.73
5	0.96	0.95	0.94	0.93	0.96	0.96	0.95	0.96	0.96	0.96	0.91	0.84
5.5	0.97	0.97	0.96	0.96	0.98	0.98	0.97	0.97	0.97	0.97	0.95	0.91
6	0.98	0.98	0.98	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.94

$\gamma = 0.2$

c_1	F^0	F^{GLS}: $\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	0.65	0.23	0.20	0.16	0.64	0.52	0.24	0.66	0.65	0.52	0.08	0.12
-14	0.56	0.26	0.22	0.18	0.54	0.44	0.23	0.56	0.55	0.44	0.09	0.12
-13	0.45	0.29	0.25	0.19	0.43	0.37	0.22	0.46	0.45	0.38	0.10	0.12
-12	0.37	0.30	0.27	0.21	0.36	0.33	0.22	0.38	0.38	0.32	0.10	0.12
-11	0.31	0.30	0.28	0.23	0.30	0.29	0.22	0.31	0.32	0.29	0.11	0.12
-10	0.26	0.28	0.27	0.23	0.26	0.26	0.22	0.27	0.27	0.26	0.12	0.13
-9	0.22	0.26	0.27	0.23	0.22	0.23	0.21	0.23	0.23	0.23	0.12	0.12
-8	0.19	0.23	0.25	0.22	0.19	0.20	0.20	0.19	0.20	0.21	0.12	0.12
-7	0.16	0.20	0.22	0.20	0.16	0.18	0.18	0.16	0.17	0.18	0.11	0.11
-6	0.13	0.17	0.19	0.18	0.13	0.15	0.17	0.13	0.14	0.15	0.10	0.10
-5	0.11	0.14	0.16	0.15	0.11	0.13	0.14	0.11	0.12	0.13	0.09	0.09
-4	0.09	0.11	0.13	0.13	0.09	0.11	0.12	0.09	0.10	0.11	0.08	0.08
-3	0.07	0.09	0.11	0.10	0.07	0.09	0.10	0.08	0.08	0.09	0.07	0.07
-2	0.07	0.08	0.09	0.08	0.06	0.07	0.08	0.06	0.07	0.07	0.06	0.06
-1	0.05	0.06	0.07	0.07	0.05	0.06	0.07	0.05	0.06	0.06	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.06	0.05	0.04	0.04	0.06	0.05	0.04	0.06	0.06	0.05	0.04	0.05
1	0.11	0.05	0.04	0.04	0.10	0.06	0.04	0.11	0.10	0.07	0.03	0.04
1.5	0.22	0.07	0.03	0.03	0.22	0.14	0.06	0.22	0.21	0.16	0.03	0.04
2	0.40	0.17	0.05	0.03	0.40	0.32	0.16	0.40	0.40	0.34	0.02	0.03
2.5	0.59	0.40	0.14	0.08	0.59	0.53	0.39	0.59	0.58	0.54	0.07	0.02
3	0.73	0.61	0.44	0.35	0.74	0.71	0.62	0.73	0.73	0.71	0.32	0.07
3.5	0.83	0.76	0.69	0.65	0.83	0.82	0.77	0.83	0.83	0.82	0.58	0.27
4	0.89	0.85	0.82	0.81	0.90	0.89	0.86	0.89	0.89	0.89	0.75	0.52
4.5	0.93	0.91	0.89	0.88	0.94	0.93	0.92	0.93	0.93	0.93	0.85	0.71
5	0.96	0.94	0.94	0.93	0.96	0.96	0.95	0.96	0.96	0.96	0.91	0.83
5.5	0.97	0.97	0.96	0.96	0.97	0.97	0.97	0.97	0.97	0.97	0.94	0.90
6	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.94

Table 8. Size and power of tests, $c_2 = -\gamma c_1$

$\gamma = 0.3$

c_1	F^0	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -2$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -4$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -6$	F^{GLS} $\bar{c}_1 = 2, \bar{c}_2 = -2$	F^{GLS} $\bar{c}_1 = 4, \bar{c}_2 = -4$	F^{GLS} $\bar{c}_1 = 6, \bar{c}_2 = -6$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 2$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 4$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	0.91	0.69	0.64	0.60	0.93	0.90	0.79	0.92	0.92	0.89	0.49	0.33
-14	0.88	0.59	0.52	0.47	0.89	0.84	0.70	0.88	0.88	0.84	0.35	0.20
-13	0.82	0.48	0.38	0.32	0.84	0.77	0.58	0.83	0.83	0.77	0.20	0.11
-12	0.75	0.34	0.23	0.17	0.76	0.67	0.45	0.75	0.75	0.67	0.09	0.07
-11	0.65	0.23	0.13	0.09	0.64	0.55	0.30	0.65	0.64	0.55	0.04	0.06
-10	0.51	0.16	0.11	0.09	0.49	0.40	0.19	0.51	0.50	0.41	0.04	0.06
-9	0.35	0.15	0.13	0.10	0.33	0.27	0.13	0.35	0.35	0.28	0.05	0.06
-8	0.22	0.16	0.14	0.11	0.20	0.19	0.11	0.22	0.22	0.19	0.06	0.07
-7	0.15	0.15	0.15	0.13	0.15	0.14	0.11	0.15	0.16	0.15	0.07	0.08
-6	0.12	0.13	0.14	0.13	0.11	0.12	0.11	0.12	0.12	0.13	0.07	0.08
-5	0.10	0.12	0.13	0.12	0.10	0.11	0.11	0.10	0.10	0.11	0.08	0.08
-4	0.08	0.10	0.11	0.11	0.08	0.09	0.10	0.08	0.08	0.10	0.07	0.08
-3	0.07	0.08	0.10	0.09	0.07	0.08	0.09	0.07	0.07	0.08	0.07	0.07
-2	0.06	0.07	0.08	0.08	0.06	0.07	0.08	0.06	0.06	0.07	0.06	0.06
-1	0.05	0.06	0.06	0.06	0.05	0.06	0.06	0.05	0.05	0.06	0.06	0.05
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.06	0.05	0.04	0.04	0.06	0.05	0.04	0.06	0.06	0.05	0.05	0.05
1	0.09	0.05	0.04	0.04	0.09	0.06	0.04	0.10	0.09	0.07	0.04	0.04
1.5	0.19	0.06	0.03	0.03	0.19	0.12	0.05	0.20	0.19	0.14	0.03	0.04
2	0.36	0.14	0.04	0.03	0.36	0.28	0.13	0.37	0.36	0.30	0.02	0.03
2.5	0.56	0.36	0.11	0.06	0.56	0.50	0.35	0.56	0.56	0.51	0.05	0.02
3	0.72	0.59	0.40	0.31	0.72	0.68	0.59	0.71	0.71	0.69	0.28	0.06
3.5	0.81	0.74	0.66	0.61	0.82	0.80	0.75	0.82	0.82	0.81	0.54	0.23
4	0.88	0.84	0.81	0.79	0.89	0.88	0.85	0.89	0.89	0.88	0.73	0.49
4.5	0.93	0.90	0.88	0.87	0.93	0.93	0.91	0.93	0.93	0.93	0.84	0.69
5	0.95	0.94	0.93	0.93	0.96	0.95	0.94	0.96	0.96	0.95	0.90	0.82
5.5	0.97	0.96	0.96	0.95	0.97	0.97	0.96	0.97	0.97	0.97	0.94	0.89
6	0.98	0.98	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.96	0.93

$\gamma = 0.4$

c_1	F^0	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -2$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -4$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -6$	F^{GLS} $\bar{c}_1 = 2, \bar{c}_2 = -2$	F^{GLS} $\bar{c}_1 = 4, \bar{c}_2 = -4$	F^{GLS} $\bar{c}_1 = 6, \bar{c}_2 = -6$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 2$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 4$	F^{GLS} $\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	0.98	0.94	0.93	0.92	0.98	0.98	0.97	0.98	0.98	0.97	0.90	0.86
-14	0.96	0.91	0.90	0.89	0.97	0.96	0.95	0.97	0.97	0.96	0.85	0.78
-13	0.95	0.87	0.85	0.84	0.96	0.94	0.91	0.95	0.95	0.94	0.78	0.67
-12	0.92	0.81	0.78	0.76	0.93	0.91	0.86	0.93	0.92	0.91	0.68	0.52
-11	0.88	0.72	0.67	0.64	0.89	0.86	0.78	0.89	0.88	0.86	0.54	0.32
-10	0.82	0.59	0.51	0.46	0.83	0.78	0.66	0.82	0.82	0.78	0.35	0.16
-9	0.73	0.42	0.30	0.24	0.73	0.66	0.49	0.73	0.73	0.66	0.15	0.06
-8	0.58	0.24	0.11	0.07	0.58	0.50	0.30	0.58	0.58	0.51	0.04	0.04
-7	0.38	0.12	0.08	0.06	0.37	0.31	0.14	0.39	0.39	0.32	0.03	0.04
-6	0.20	0.10	0.09	0.08	0.19	0.16	0.08	0.20	0.21	0.17	0.04	0.05
-5	0.11	0.10	0.10	0.09	0.10	0.10	0.08	0.11	0.11	0.11	0.05	0.06
-4	0.08	0.09	0.09	0.09	0.07	0.08	0.08	0.08	0.08	0.08	0.06	0.07
-3	0.06	0.08	0.09	0.08	0.07	0.07	0.08	0.07	0.07	0.08	0.06	0.07
-2	0.06	0.07	0.07	0.07	0.06	0.06	0.07	0.06	0.06	0.07	0.06	0.06
-1	0.05	0.06	0.06	0.06	0.05	0.06	0.06	0.05	0.05	0.06	0.06	0.06
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.06	0.05	0.05	0.04	0.06	0.05	0.04	0.06	0.06	0.05	0.05	0.05
1	0.09	0.05	0.04	0.04	0.08	0.06	0.04	0.09	0.08	0.06	0.04	0.04
1.5	0.17	0.05	0.03	0.03	0.17	0.10	0.05	0.17	0.17	0.12	0.03	0.04
2	0.34	0.12	0.04	0.03	0.33	0.25	0.11	0.33	0.33	0.27	0.02	0.03
2.5	0.53	0.31	0.08	0.05	0.53	0.47	0.31	0.53	0.53	0.48	0.03	0.02
3	0.69	0.55	0.35	0.26	0.70	0.66	0.56	0.70	0.70	0.67	0.23	0.05
3.5	0.80	0.72	0.63	0.59	0.81	0.79	0.74	0.81	0.81	0.80	0.51	0.20
4	0.88	0.83	0.80	0.77	0.88	0.87	0.84	0.88	0.88	0.87	0.71	0.46
4.5	0.92	0.89	0.88	0.86	0.93	0.92	0.90	0.92	0.92	0.92	0.82	0.67
5	0.95	0.94	0.93	0.92	0.95	0.95	0.94	0.95	0.95	0.95	0.89	0.80
5.5	0.97	0.96	0.96	0.95	0.97	0.97	0.96	0.97	0.97	0.97	0.94	0.88
6	0.98	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.96	0.93

Table 9. Size and power of tests, $c_2 = -\gamma c_1$

	$\gamma = 0.5$												$\gamma = 0.6$											
c_1	F^0	F^{GLS}									F_d^{OLS}	F_i^{OLS}	F^0	F^{GLS}									F_d^{OLS}	F_i^{OLS}
		$\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$				$\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$		
-15	0.99	0.99	0.98	0.98	1.00	0.99	0.99	0.99	0.99	0.99	0.98	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99
-14	0.99	0.98	0.98	0.97	0.99	0.99	0.99	0.99	0.99	0.99	0.97	0.95	1.00	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99
-13	0.99	0.97	0.96	0.96	0.99	0.98	0.98	0.99	0.98	0.98	0.94	0.92	1.00	0.99	0.99	0.99	1.00	1.00	0.99	1.00	0.99	0.99	0.98	0.98
-12	0.98	0.95	0.94	0.93	0.98	0.97	0.96	0.98	0.97	0.97	0.91	0.87	0.99	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.97	0.96
-11	0.96	0.92	0.90	0.89	0.97	0.96	0.94	0.96	0.96	0.95	0.86	0.78	0.99	0.97	0.97	0.97	0.99	0.99	0.98	0.99	0.98	0.98	0.96	0.93
-10	0.93	0.87	0.84	0.83	0.94	0.93	0.89	0.94	0.93	0.92	0.77	0.63	0.98	0.96	0.95	0.94	0.98	0.97	0.96	0.98	0.97	0.97	0.92	0.88
-9	0.89	0.78	0.74	0.71	0.90	0.88	0.82	0.89	0.89	0.87	0.62	0.41	0.95	0.92	0.91	0.90	0.96	0.95	0.93	0.96	0.95	0.95	0.86	0.77
-8	0.82	0.65	0.57	0.53	0.83	0.79	0.69	0.82	0.82	0.79	0.42	0.19	0.92	0.85	0.83	0.81	0.93	0.91	0.88	0.92	0.92	0.91	0.75	0.58
-7	0.70	0.44	0.30	0.23	0.70	0.65	0.50	0.70	0.70	0.65	0.16	0.06	0.86	0.74	0.69	0.66	0.86	0.84	0.77	0.86	0.86	0.84	0.56	0.32
-6	0.50	0.20	0.08	0.05	0.50	0.43	0.25	0.50	0.50	0.44	0.03	0.03	0.73	0.53	0.41	0.35	0.75	0.70	0.58	0.74	0.74	0.70	0.26	0.09
-5	0.26	0.09	0.07	0.06	0.25	0.20	0.08	0.26	0.26	0.21	0.03	0.04	0.52	0.25	0.08	0.05	0.52	0.46	0.29	0.52	0.52	0.47	0.04	0.03
-4	0.10	0.07	0.08	0.07	0.10	0.09	0.07	0.10	0.11	0.09	0.04	0.05	0.24	0.08	0.06	0.05	0.24	0.18	0.07	0.24	0.24	0.20	0.03	0.04
-3	0.06	0.07	0.07	0.07	0.07	0.06	0.06	0.07	0.07	0.07	0.05	0.06	0.09	0.06	0.06	0.06	0.09	0.07	0.06	0.09	0.09	0.08	0.04	0.05
-2	0.05	0.06	0.07	0.07	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.06	0.06	0.06	0.05	0.06	0.06	0.05	0.06	0.06	0.05	0.06
-1	0.05	0.06	0.06	0.06	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.06	0.05	0.04	0.04	0.06	0.05	0.04	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.04	0.06	0.06	0.05	0.05	0.05
1	0.08	0.04	0.04	0.04	0.08	0.06	0.04	0.08	0.08	0.06	0.04	0.04	0.07	0.05	0.04	0.04	0.07	0.05	0.04	0.08	0.07	0.06	0.04	0.05
1.5	0.15	0.05	0.04	0.03	0.15	0.09	0.04	0.15	0.15	0.10	0.03	0.04	0.13	0.05	0.04	0.03	0.13	0.08	0.04	0.13	0.13	0.09	0.03	0.04
2	0.31	0.10	0.03	0.03	0.30	0.22	0.09	0.31	0.30	0.24	0.02	0.03	0.27	0.08	0.04	0.03	0.27	0.20	0.07	0.28	0.27	0.22	0.02	0.03
2.5	0.50	0.28	0.07	0.04	0.50	0.44	0.28	0.50	0.50	0.45	0.03	0.03	0.47	0.24	0.06	0.04	0.48	0.41	0.25	0.48	0.47	0.43	0.02	0.02
3	0.67	0.52	0.31	0.22	0.68	0.64	0.53	0.68	0.68	0.65	0.20	0.04	0.66	0.49	0.27	0.18	0.66	0.62	0.50	0.66	0.66	0.63	0.17	0.04
3.5	0.80	0.70	0.61	0.56	0.80	0.78	0.72	0.80	0.80	0.78	0.48	0.19	0.78	0.68	0.58	0.53	0.79	0.76	0.70	0.79	0.79	0.77	0.45	0.16
4	0.87	0.82	0.78	0.75	0.88	0.86	0.83	0.87	0.87	0.86	0.69	0.43	0.86	0.80	0.76	0.74	0.87	0.86	0.82	0.87	0.87	0.86	0.67	0.41
4.5	0.92	0.89	0.87	0.85	0.92	0.92	0.90	0.92	0.92	0.91	0.81	0.65	0.91	0.88	0.86	0.85	0.92	0.91	0.89	0.92	0.92	0.91	0.80	0.63
5	0.95	0.93	0.92	0.91	0.95	0.95	0.94	0.95	0.95	0.95	0.89	0.79	0.95	0.93	0.92	0.91	0.95	0.95	0.93	0.95	0.95	0.94	0.88	0.78
5.5	0.97	0.96	0.95	0.95	0.97	0.97	0.96	0.97	0.97	0.97	0.93	0.88	0.97	0.95	0.95	0.94	0.97	0.96	0.96	0.97	0.96	0.96	0.93	0.87
6	0.98	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.96	0.93	0.98	0.97	0.97	0.96	0.98	0.98	0.97	0.98	0.98	0.98	0.95	0.92

Table 10. Size and power of tests, $c_2 = -\gamma c_1$

c_1	$\gamma = 0.7$: F^0	$\gamma = 0.7$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = -2$	$\gamma = 0.7$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = -4$	$\gamma = 0.7$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = -6$	$\gamma = 0.7$: F^{GLS}, $\bar{c}_1 = 2, \bar{c}_2 = -2$	$\gamma = 0.7$: F^{GLS}, $\bar{c}_1 = 4, \bar{c}_2 = -4$	$\gamma = 0.7$: F^{GLS}, $\bar{c}_1 = 6, \bar{c}_2 = -6$	$\gamma = 0.7$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = 2$	$\gamma = 0.7$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = 4$	$\gamma = 0.7$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = 6$	$\gamma = 0.7$: F_d^{OLS}	$\gamma = 0.7$: F_i^{OLS}	$\gamma = 0.8$: F^0	$\gamma = 0.8$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = -2$	$\gamma = 0.8$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = -4$	$\gamma = 0.8$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = -6$	$\gamma = 0.8$: F^{GLS}, $\bar{c}_1 = 2, \bar{c}_2 = -2$	$\gamma = 0.8$: F^{GLS}, $\bar{c}_1 = 4, \bar{c}_2 = -4$	$\gamma = 0.8$: F^{GLS}, $\bar{c}_1 = 6, \bar{c}_2 = -6$	$\gamma = 0.8$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = 2$	$\gamma = 0.8$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = 4$	$\gamma = 0.8$: F^{GLS}, $\bar{c}_1 = \bar{c}_2 = 6$	$\gamma = 0.8$: F_d^{OLS}	$\gamma = 0.8$: F_i^{OLS}
-15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-12	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-11	1.00	0.99	0.99	0.99	1.00	1.00	0.99	1.00	0.99	0.99	0.99	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99
-10	0.99	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.97	0.96	1.00	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99
-9	0.98	0.97	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.98	0.94	0.91	0.99	0.99	0.99	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.97
-8	0.96	0.94	0.93	0.92	0.97	0.96	0.95	0.97	0.96	0.96	0.90	0.83	0.98	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.96	0.93
-7	0.93	0.88	0.86	0.85	0.93	0.92	0.90	0.93	0.93	0.92	0.79	0.65	0.96	0.94	0.93	0.93	0.97	0.96	0.95	0.96	0.96	0.96	0.90	0.84
-6	0.86	0.76	0.71	0.68	0.87	0.84	0.79	0.86	0.86	0.84	0.59	0.34	0.92	0.88	0.85	0.84	0.93	0.91	0.89	0.92	0.92	0.91	0.79	0.64
-5	0.72	0.53	0.40	0.33	0.72	0.68	0.57	0.72	0.72	0.68	0.25	0.08	0.83	0.72	0.67	0.63	0.84	0.82	0.75	0.83	0.83	0.82	0.54	0.28
-4	0.45	0.19	0.06	0.04	0.45	0.39	0.22	0.45	0.46	0.40	0.02	0.03	0.63	0.42	0.23	0.15	0.64	0.59	0.46	0.64	0.64	0.60	0.13	0.04
-3	0.16	0.06	0.05	0.05	0.16	0.11	0.05	0.16	0.16	0.12	0.03	0.04	0.29	0.09	0.04	0.04	0.29	0.23	0.09	0.29	0.29	0.24	0.02	0.03
-2	0.06	0.05	0.06	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.05	0.05	0.08	0.05	0.05	0.05	0.08	0.06	0.05	0.08	0.08	0.07	0.04	0.05
-1	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
1	0.07	0.05	0.04	0.04	0.07	0.05	0.04	0.07	0.07	0.05	0.04	0.05	0.06	0.05	0.04	0.04	0.06	0.05	0.04	0.06	0.06	0.05	0.04	0.05
1.5	0.12	0.05	0.04	0.04	0.12	0.07	0.04	0.12	0.12	0.09	0.03	0.04	0.10	0.05	0.04	0.04	0.10	0.07	0.04	0.11	0.11	0.08	0.03	0.04
2	0.25	0.07	0.04	0.03	0.25	0.17	0.06	0.25	0.25	0.19	0.02	0.03	0.23	0.06	0.04	0.03	0.23	0.16	0.06	0.23	0.23	0.17	0.02	0.03
2.5	0.45	0.21	0.05	0.03	0.45	0.38	0.21	0.45	0.45	0.40	0.02	0.03	0.43	0.19	0.05	0.03	0.43	0.36	0.19	0.43	0.43	0.37	0.02	0.03
3	0.64	0.46	0.24	0.15	0.65	0.60	0.48	0.65	0.65	0.61	0.14	0.04	0.62	0.43	0.21	0.13	0.63	0.58	0.45	0.62	0.63	0.59	0.12	0.04
3.5	0.77	0.66	0.56	0.50	0.78	0.76	0.68	0.78	0.78	0.76	0.42	0.15	0.76	0.64	0.54	0.48	0.77	0.74	0.66	0.77	0.77	0.74	0.40	0.14
4	0.86	0.79	0.75	0.72	0.86	0.85	0.81	0.86	0.86	0.85	0.64	0.38	0.85	0.78	0.73	0.70	0.86	0.84	0.80	0.86	0.86	0.84	0.63	0.36
4.5	0.91	0.87	0.85	0.84	0.92	0.91	0.88	0.91	0.91	0.91	0.79	0.61	0.91	0.87	0.84	0.83	0.91	0.90	0.88	0.91	0.91	0.90	0.78	0.59
5	0.94	0.92	0.91	0.90	0.95	0.94	0.93	0.94	0.94	0.94	0.87	0.77	0.94	0.92	0.91	0.90	0.95	0.94	0.92	0.94	0.94	0.94	0.87	0.76
5.5	0.96	0.95	0.94	0.94	0.97	0.96	0.96	0.97	0.97	0.96	0.92	0.86	0.96	0.95	0.94	0.94	0.97	0.96	0.95	0.96	0.96	0.96	0.92	0.85
6	0.98	0.97	0.97	0.96	0.98	0.98	0.97	0.98	0.98	0.98	0.95	0.92	0.98	0.97	0.96	0.96	0.98	0.98	0.97	0.98	0.98	0.98	0.95	0.91

Table 11. Size and power of tests, $c_2 = -\gamma c_1$

$\gamma = 0.9$

c_1	F^0	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-9	1.00	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99
-8	0.99	0.99	0.99	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.97
-7	0.98	0.97	0.97	0.96	0.98	0.98	0.98	0.98	0.98	0.98	0.95	0.92
-6	0.96	0.94	0.92	0.92	0.96	0.95	0.94	0.96	0.96	0.95	0.89	0.81
-5	0.90	0.84	0.82	0.80	0.91	0.89	0.86	0.90	0.90	0.89	0.74	0.54
-4	0.76	0.62	0.51	0.46	0.77	0.73	0.65	0.77	0.77	0.74	0.37	0.13
-3	0.45	0.21	0.05	0.04	0.45	0.39	0.22	0.46	0.46	0.40	0.02	0.03
-2	0.12	0.05	0.05	0.04	0.12	0.08	0.04	0.12	0.12	0.09	0.03	0.04
-1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
1	0.06	0.05	0.04	0.05	0.06	0.05	0.04	0.06	0.06	0.05	0.04	0.05
1.5	0.10	0.05	0.04	0.04	0.10	0.07	0.04	0.10	0.10	0.07	0.04	0.04
2	0.21	0.06	0.04	0.04	0.21	0.14	0.05	0.21	0.21	0.16	0.03	0.03
2.5	0.41	0.17	0.04	0.03	0.40	0.34	0.17	0.41	0.41	0.35	0.02	0.03
3	0.61	0.40	0.18	0.11	0.61	0.56	0.43	0.61	0.61	0.57	0.10	0.03
3.5	0.76	0.62	0.51	0.45	0.76	0.73	0.65	0.76	0.76	0.73	0.37	0.12
4	0.85	0.77	0.72	0.69	0.85	0.83	0.78	0.85	0.85	0.84	0.61	0.34
4.5	0.91	0.86	0.84	0.82	0.91	0.90	0.87	0.91	0.91	0.90	0.76	0.57
5	0.94	0.91	0.90	0.89	0.95	0.94	0.92	0.94	0.94	0.94	0.86	0.74
5.5	0.96	0.95	0.94	0.93	0.97	0.96	0.95	0.96	0.96	0.96	0.91	0.85
6	0.98	0.97	0.96	0.96	0.98	0.98	0.97	0.98	0.98	0.97	0.95	0.91

$\gamma = 1$

c_1	F^0	F^{GLS} $\bar{c}_1 = \bar{c}_2 = -2$	$\bar{c}_1 = \bar{c}_2 = -4$	$\bar{c}_1 = \bar{c}_2 = -6$	$\bar{c}_1 = 2, \bar{c}_2 = -2$	$\bar{c}_1 = 4, \bar{c}_2 = -4$	$\bar{c}_1 = 6, \bar{c}_2 = -6$	$\bar{c}_1 = \bar{c}_2 = 2$	$\bar{c}_1 = \bar{c}_2 = 4$	$\bar{c}_1 = \bar{c}_2 = 6$	F_d^{OLS}	F_i^{OLS}
-15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-9	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
-8	1.00	1.00	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99
-7	0.99	0.99	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.96
-6	0.98	0.97	0.96	0.96	0.98	0.98	0.97	0.98	0.97	0.97	0.94	0.90
-5	0.94	0.91	0.89	0.88	0.94	0.94	0.92	0.94	0.94	0.94	0.85	0.73
-4	0.84	0.76	0.71	0.68	0.85	0.83	0.78	0.84	0.84	0.83	0.59	0.32
-3	0.60	0.38	0.16	0.09	0.60	0.55	0.41	0.60	0.60	0.55	0.08	0.03
-2	0.19	0.06	0.04	0.04	0.19	0.13	0.05	0.19	0.19	0.14	0.03	0.04
-1	0.06	0.05	0.05	0.05	0.06	0.05	0.05	0.06	0.06	0.05	0.05	0.05
0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
1	0.06	0.05	0.05	0.05	0.06	0.05	0.05	0.06	0.06	0.05	0.05	0.05
1.5	0.09	0.05	0.04	0.04	0.08	0.06	0.04	0.09	0.09	0.07	0.04	0.05
2	0.19	0.06	0.04	0.04	0.19	0.12	0.05	0.19	0.19	0.14	0.03	0.04
2.5	0.39	0.15	0.04	0.03	0.38	0.32	0.15	0.39	0.39	0.33	0.02	0.03
3	0.60	0.38	0.16	0.09	0.60	0.55	0.41	0.60	0.60	0.55	0.08	0.03
3.5	0.75	0.60	0.49	0.43	0.75	0.72	0.63	0.75	0.75	0.72	0.34	0.11
4	0.84	0.75	0.70	0.67	0.85	0.83	0.78	0.84	0.85	0.83	0.59	0.32
4.5	0.90	0.85	0.83	0.81	0.91	0.90	0.87	0.90	0.90	0.90	0.75	0.56
5	0.94	0.91	0.90	0.89	0.94	0.94	0.92	0.94	0.94	0.93	0.85	0.73
5.5	0.96	0.94	0.94	0.93	0.97	0.96	0.95	0.96	0.96	0.96	0.91	0.84
6	0.97	0.96	0.96	0.96	0.98	0.97	0.97	0.98	0.97	0.97	0.94	0.90

Table 12. Finite sample size

θ_1/φ_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	BIC	$MAIC$	$MBIC$	$MAIC$-PQ	$MBIC$-PQ	AIC	BIC	$MAIC$	$MBIC$	AIC	BIC	$MAIC$	$MBIC$
i.i.d. errors														
	0.063	0.057	0.045	0.044	0.044	0.044	0.034	0.027	0.014	0.014	0.029	0.026	0.012	0.012
MA(2) errors														
-0.8	0.548	0.773	0.066	0.066	0.032	0.032	0.952	0.998	0.033	0.033	0.966	0.999	0.248	0.247
-0.5	0.216	0.326	0.026	0.025	0.034	0.040	0.143	0.260	0.007	0.007	0.183	0.354	0.017	0.023
0.5	0.086	0.092	0.032	0.027	0.041	0.042	0.042	0.043	0.009	0.008	0.033	0.038	0.014	0.016
0.8	0.088	0.096	0.020	0.018	0.034	0.034	0.038	0.043	0.006	0.005	0.029	0.037	0.011	0.014
MA(1) errors, $\theta_2 = 0$														
-0.8	0.477	0.656	0.048	0.046	0.046	0.048	0.392	0.590	0.013	0.012	0.478	0.712	0.017	0.019
-0.5	0.136	0.195	0.035	0.033	0.038	0.043	0.066	0.102	0.009	0.008	0.083	0.160	0.012	0.017
0.5	0.079	0.086	0.037	0.031	0.042	0.042	0.033	0.039	0.010	0.010	0.034	0.039	0.012	0.012
0.8	0.080	0.080	0.028	0.021	0.033	0.032	0.037	0.038	0.008	0.009	0.031	0.036	0.011	0.014
AR(2) errors														
-0.8	0.066	0.060	0.040	0.039	0.039	0.038	0.033	0.026	0.012	0.011	0.027	0.024	0.009	0.010
-0.5	0.062	0.060	0.036	0.030	0.034	0.031	0.029	0.026	0.011	0.008	0.025	0.025	0.011	0.015
0.5	0.072	0.071	0.044	0.039	0.045	0.045	0.036	0.046	0.015	0.013	0.032	0.037	0.015	0.014
0.8	0.075	0.068	0.047	0.047	0.048	0.048	0.028	0.024	0.014	0.014	0.032	0.031	0.019	0.019
AR(1) errors, $\varphi_2 = 0$														
-0.8	0.065	0.058	0.033	0.032	0.038	0.040	0.033	0.027	0.015	0.014	0.029	0.027	0.020	0.027
-0.5	0.078	0.087	0.028	0.026	0.030	0.031	0.032	0.031	0.008	0.007	0.031	0.040	0.012	0.014
0.5	0.096	0.101	0.045	0.043	0.053	0.057	0.034	0.032	0.010	0.010	0.036	0.047	0.016	0.019
0.8	0.093	0.083	0.049	0.048	0.091	0.112	0.029	0.026	0.021	0.028	0.043	0.041	0.038	0.061

Table 13. Finite sample size-adjusted power, i.i.d. errors

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
							$c_2 = -0.5c_1$							
5	0.943	0.944	0.830	0.832	0.896	0.909	0.128	0.220	0.008	0.007	0.704	0.746	0.692	0.690
3	0.662	0.670	0.544	0.548	0.567	0.597	0.097	0.180	0.011	0.011	0.025	0.029	0.038	0.038
2	0.289	0.299	0.244	0.246	0.229	0.243	0.025	0.034	0.022	0.022	0.029	0.029	0.035	0.035
1	0.079	0.078	0.073	0.074	0.070	0.072	0.037	0.037	0.035	0.035	0.041	0.037	0.044	0.042
-5	0.239	0.245	0.234	0.237	0.233	0.238	0.033	0.035	0.032	0.033	0.041	0.046	0.045	0.045
-10	0.924	0.924	0.906	0.907	0.915	0.917	0.263	0.409	0.019	0.018	0.574	0.619	0.549	0.546
-15	0.965	0.989	0.462	0.462	0.632	0.837	0.062	0.088	0.007	0.006	0.976	0.977	0.969	0.968
-20	0.231	0.323	0.060	0.060	0.089	0.176	0.009	0.013	0.002	0.002	0.995	0.995	0.995	0.994
-30	0.002	0.003	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	1.000	0.986	0.993	0.914
-40	0.322	0.286	0.313	0.350	0.168	0.135	0.292	0.262	0.282	0.223	0.084	0.093	0.085	0.087
							$c_2 = 0$							
5	0.958	0.961	0.790	0.793	0.888	0.917	0.082	0.145	0.005	0.005	0.791	0.824	0.779	0.780
3	0.771	0.777	0.586	0.586	0.623	0.668	0.106	0.202	0.008	0.008	0.055	0.064	0.071	0.073
2	0.447	0.453	0.343	0.341	0.323	0.349	0.038	0.059	0.015	0.015	0.020	0.022	0.029	0.027
1	0.125	0.128	0.108	0.109	0.098	0.103	0.029	0.030	0.029	0.029	0.034	0.034	0.041	0.039
-5	0.133	0.140	0.136	0.140	0.137	0.139	0.094	0.106	0.100	0.099	0.092	0.094	0.091	0.089
-10	0.351	0.371	0.338	0.342	0.329	0.340	0.175	0.204	0.188	0.191	0.181	0.189	0.169	0.169
-15	0.629	0.664	0.562	0.567	0.522	0.534	0.325	0.379	0.294	0.296	0.330	0.352	0.266	0.263
-20	0.838	0.874	0.690	0.699	0.620	0.639	0.502	0.560	0.383	0.384	0.506	0.539	0.336	0.325
-30	0.978	0.994	0.736	0.729	0.587	0.583	0.812	0.880	0.405	0.386	0.815	0.868	0.355	0.328
-40	0.992	0.999	0.705	0.697	0.537	0.520	0.942	0.982	0.386	0.368	0.941	0.980	0.324	0.297
							$c_2 = 0.5c_1$							
5	0.977	0.978	0.783	0.784	0.874	0.925	0.049	0.081	0.004	0.004	0.893	0.911	0.885	0.885
3	0.864	0.866	0.626	0.625	0.678	0.746	0.108	0.210	0.007	0.007	0.199	0.236	0.229	0.235
2	0.636	0.642	0.458	0.458	0.453	0.501	0.065	0.124	0.009	0.009	0.019	0.020	0.027	0.026
1	0.217	0.227	0.181	0.183	0.163	0.172	0.026	0.028	0.024	0.025	0.029	0.028	0.032	0.033
-5	0.269	0.284	0.284	0.289	0.284	0.286	0.115	0.133	0.126	0.127	0.109	0.108	0.106	0.102
-10	0.788	0.818	0.771	0.783	0.759	0.778	0.306	0.348	0.310	0.319	0.281	0.292	0.253	0.252
-15	0.987	0.995	0.930	0.935	0.910	0.914	0.649	0.717	0.545	0.544	0.576	0.613	0.444	0.430
-20	0.998	1.000	0.948	0.948	0.933	0.927	0.898	0.943	0.651	0.641	0.849	0.883	0.550	0.527
-30	1.000	1.000	0.974	0.973	0.966	0.965	0.996	0.999	0.709	0.701	0.993	0.998	0.600	0.584
-40	1.000	1.000	0.991	0.991	0.990	0.990	0.999	1.000	0.787	0.784	0.998	1.000	0.690	0.678
							$c_2 = c_1$							
5	0.929	0.976	0.549	0.551	0.821	0.924	0.023	0.033	0.002	0.002	0.968	0.971	0.962	0.961
3	0.933	0.934	0.681	0.682	0.747	0.832	0.086	0.155	0.007	0.006	0.570	0.625	0.587	0.590
2	0.784	0.792	0.552	0.549	0.576	0.635	0.103	0.192	0.010	0.010	0.056	0.063	0.072	0.078
1	0.354	0.364	0.278	0.279	0.245	0.262	0.029	0.039	0.018	0.018	0.024	0.024	0.031	0.031
-5	0.440	0.469	0.463	0.476	0.469	0.473	0.162	0.180	0.170	0.172	0.153	0.158	0.149	0.146
-10	0.965	0.979	0.913	0.922	0.896	0.905	0.542	0.607	0.488	0.494	0.475	0.501	0.389	0.384
-15	0.999	1.000	0.959	0.960	0.947	0.943	0.922	0.956	0.687	0.679	0.875	0.903	0.577	0.560
-20	1.000	1.000	0.975	0.975	0.968	0.967	0.993	0.999	0.728	0.716	0.985	0.996	0.627	0.604
-30	1.000	1.000	0.994	0.994	0.994	0.994	0.999	1.000	0.828	0.827	0.999	1.000	0.747	0.734
-40	1.000	1.000	0.998	0.998	0.998	0.998	1.000	1.000	0.910	0.909	0.999	1.000	0.860	0.854

Table 14. Finite sample size-adjusted power, MA(2) errors, $c_2 = -0.5c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	BIC	$MAIC$	$MBIC$	$MAIC$-PQ	$MBIC$-PQ	AIC	BIC	$MAIC$	$MBIC$	AIC	BIC	$MAIC$	$MBIC$
							$\theta_1 = \theta_2 = -0.8$							
5	0.125	0.217	0.723	0.721	0.001	0.004	0.001	0.000	0.001	0.001	0.001	0.000	0.000	0.000
3	0.048	0.043	0.055	0.055	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002
2	0.037	0.037	0.050	0.051	0.008	0.008	0.007	0.005	0.004	0.004	0.007	0.007	0.004	0.004
1	0.043	0.039	0.043	0.043	0.035	0.036	0.019	0.019	0.023	0.023	0.025	0.027	0.023	0.023
-5	0.074	0.082	0.164	0.164	0.017	0.017	0.011	0.009	0.010	0.010	0.011	0.010	0.010	0.010
-10	0.164	0.212	0.670	0.667	0.002	0.007	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
-15	0.005	0.010	0.756	0.756	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.054
-20	0.001	0.006	0.115	0.115	0.000	0.001	0.000	0.000	0.000	0.000	0.174	0.336	0.593	0.716
-30	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.417	0.710	0.919	0.976
-40	0.299	0.263	0.201	0.175	0.121	0.108	0.255	0.233	0.268	0.244	0.016	0.031	0.037	0.053
							$\theta_1 = \theta_2 = -0.5$							
5	0.874	0.718	0.955	0.954	0.939	0.951	0.002	0.002	0.002	0.001	0.039	0.003	0.821	0.872
3	0.245	0.060	0.695	0.696	0.681	0.705	0.012	0.011	0.012	0.012	0.012	0.013	0.246	0.460
2	0.054	0.046	0.250	0.233	0.244	0.236	0.023	0.022	0.018	0.018	0.024	0.023	0.135	0.229
1	0.050	0.042	0.059	0.058	0.063	0.065	0.037	0.040	0.039	0.038	0.037	0.042	0.068	0.078
-5	0.141	0.150	0.330	0.334	0.343	0.357	0.051	0.052	0.037	0.036	0.053	0.055	0.109	0.149
-10	0.871	0.733	0.942	0.943	0.945	0.948	0.011	0.010	0.006	0.004	0.013	0.011	0.761	0.837
-15	0.921	0.829	0.898	0.898	0.593	0.781	0.006	0.014	0.004	0.003	0.807	0.588	0.990	0.991
-20	0.173	0.284	0.146	0.146	0.078	0.129	0.003	0.006	0.001	0.001	0.991	0.974	0.999	0.999
-30	0.002	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	1.000	1.000	1.000	1.000
-40	0.430	0.315	0.375	0.329	0.309	0.283	0.386	0.320	0.490	0.445	0.079	0.086	0.093	0.110
							$\theta_1 = \theta_2 = 0.5$							
5	0.924	0.936	0.857	0.875	0.896	0.917	0.006	0.011	0.003	0.003	0.679	0.682	0.716	0.719
3	0.555	0.576	0.525	0.555	0.524	0.566	0.008	0.012	0.009	0.009	0.033	0.035	0.061	0.084
2	0.198	0.217	0.183	0.195	0.179	0.190	0.021	0.018	0.023	0.024	0.028	0.029	0.044	0.057
1	0.077	0.077	0.065	0.063	0.062	0.063	0.036	0.032	0.033	0.034	0.041	0.040	0.046	0.050
-5	0.199	0.206	0.237	0.255	0.230	0.246	0.026	0.024	0.031	0.035	0.032	0.035	0.043	0.059
-10	0.905	0.908	0.907	0.911	0.908	0.917	0.010	0.021	0.007	0.007	0.522	0.530	0.570	0.588
-15	0.812	0.873	0.490	0.495	0.608	0.811	0.007	0.014	0.001	0.001	0.969	0.956	0.970	0.961
-20	0.145	0.169	0.072	0.073	0.090	0.148	0.002	0.003	0.001	0.001	0.998	0.982	0.997	0.957
-30	0.003	0.002	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.991	0.953	0.988	0.907
-40	0.100	0.067	0.329	0.422	0.050	0.037	0.095	0.065	0.090	0.063	0.056	0.058	0.057	0.051
							$\theta_1 = \theta_2 = 0.8$							
5	0.778	0.842	0.865	0.876	0.840	0.883	0.002	0.003	0.002	0.003	0.672	0.658	0.721	0.727
3	0.404	0.462	0.482	0.519	0.425	0.486	0.010	0.009	0.008	0.008	0.029	0.031	0.057	0.079
2	0.157	0.173	0.157	0.175	0.147	0.163	0.023	0.022	0.025	0.024	0.029	0.033	0.039	0.055
1	0.058	0.059	0.055	0.054	0.059	0.062	0.039	0.040	0.040	0.042	0.042	0.039	0.047	0.054
-5	0.166	0.171	0.217	0.230	0.201	0.226	0.022	0.023	0.030	0.033	0.028	0.035	0.037	0.050
-10	0.878	0.902	0.911	0.915	0.903	0.916	0.003	0.005	0.005	0.005	0.517	0.515	0.591	0.607
-15	0.438	0.564	0.498	0.502	0.350	0.522	0.001	0.002	0.001	0.001	0.961	0.959	0.965	0.969
-20	0.061	0.085	0.072	0.072	0.045	0.075	0.000	0.001	0.000	0.000	0.996	0.996	0.996	0.997
-30	0.037	0.014	0.017	0.014	0.023	0.010	0.022	0.007	0.023	0.007	0.996	0.991	0.997	0.976
-40	0.094	0.079	0.300	0.392	0.052	0.044	0.088	0.073	0.089	0.075	0.061	0.060	0.061	0.056

Table 15. Finite sample size-adjusted power, MA(1) errors, $c_2 = -0.5c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
$\theta_1 = -0.8, \theta_2 = 0$														
5	0.741	0.760	0.950	0.951	0.952	0.955	0.003	0.015	0.003	0.004	0.007	0.012	0.850	0.901
3	0.061	0.056	0.661	0.665	0.698	0.712	0.013	0.011	0.010	0.010	0.012	0.010	0.372	0.546
2	0.048	0.047	0.159	0.159	0.216	0.229	0.022	0.019	0.019	0.018	0.022	0.021	0.157	0.224
1	0.044	0.042	0.051	0.052	0.070	0.074	0.044	0.036	0.040	0.040	0.040	0.035	0.069	0.083
-5	0.147	0.145	0.301	0.307	0.377	0.393	0.038	0.036	0.033	0.033	0.038	0.042	0.109	0.147
-10	0.730	0.717	0.944	0.945	0.950	0.952	0.009	0.012	0.010	0.011	0.009	0.010	0.793	0.852
-15	0.711	0.956	0.927	0.927	0.659	0.829	0.008	0.061	0.005	0.009	0.656	0.775	0.985	0.986
-20	0.201	0.424	0.156	0.156	0.091	0.166	0.003	0.014	0.002	0.003	0.976	0.986	0.998	0.998
-30	0.001	0.008	0.002	0.002	0.001	0.002	0.000	0.001	0.000	0.000	1.000	1.000	1.000	0.999
-40	0.362	0.326	0.339	0.313	0.287	0.257	0.352	0.314	0.465	0.416	0.079	0.095	0.097	0.117
$\theta_1 = -0.5, \theta_2 = 0$														
5	0.930	0.904	0.917	0.922	0.915	0.928	0.152	0.277	0.008	0.011	0.643	0.570	0.751	0.764
3	0.527	0.386	0.621	0.621	0.590	0.609	0.034	0.031	0.010	0.011	0.034	0.030	0.164	0.303
2	0.137	0.072	0.194	0.180	0.200	0.182	0.023	0.026	0.022	0.021	0.033	0.031	0.098	0.181
1	0.051	0.041	0.056	0.057	0.060	0.061	0.039	0.039	0.038	0.039	0.046	0.041	0.061	0.073
-5	0.175	0.139	0.253	0.258	0.265	0.265	0.048	0.052	0.036	0.036	0.060	0.057	0.080	0.112
-10	0.922	0.898	0.932	0.934	0.932	0.933	0.287	0.425	0.012	0.023	0.493	0.397	0.678	0.722
-15	0.968	0.989	0.751	0.751	0.619	0.813	0.069	0.125	0.009	0.013	0.962	0.954	0.977	0.981
-20	0.242	0.368	0.116	0.116	0.091	0.172	0.010	0.019	0.002	0.003	0.999	0.999	0.999	0.999
-30	0.002	0.004	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	1.000	1.000	1.000	0.994
-40	0.447	0.386	0.344	0.326	0.260	0.233	0.428	0.385	0.442	0.387	0.103	0.124	0.113	0.130
$\theta_1 = 0.5, \theta_2 = 0$														
5	0.937	0.939	0.852	0.873	0.899	0.916	0.017	0.026	0.005	0.005	0.698	0.724	0.713	0.711
3	0.611	0.612	0.544	0.570	0.554	0.585	0.012	0.014	0.010	0.010	0.035	0.038	0.057	0.061
2	0.232	0.223	0.223	0.243	0.202	0.216	0.021	0.022	0.022	0.022	0.031	0.033	0.042	0.054
1	0.066	0.065	0.068	0.070	0.066	0.062	0.033	0.036	0.034	0.033	0.044	0.045	0.046	0.049
-5	0.221	0.218	0.254	0.256	0.250	0.253	0.026	0.030	0.034	0.035	0.040	0.047	0.048	0.055
-10	0.912	0.913	0.907	0.910	0.912	0.913	0.044	0.057	0.006	0.006	0.544	0.563	0.555	0.552
-15	0.936	0.983	0.454	0.460	0.626	0.839	0.031	0.047	0.003	0.003	0.971	0.940	0.969	0.961
-20	0.212	0.323	0.067	0.067	0.104	0.191	0.008	0.012	0.002	0.002	0.997	0.931	0.993	0.884
-30	0.003	0.004	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.999	0.952	0.984	0.819
-40	0.166	0.106	0.309	0.391	0.086	0.048	0.163	0.102	0.148	0.083	0.079	0.083	0.079	0.071
$\theta_1 = 0.8, \theta_2 = 0$														
5	0.914	0.931	0.859	0.877	0.897	0.917	0.007	0.015	0.002	0.002	0.681	0.682	0.717	0.718
3	0.560	0.590	0.537	0.567	0.534	0.576	0.009	0.011	0.009	0.009	0.028	0.029	0.059	0.071
2	0.209	0.226	0.194	0.213	0.188	0.209	0.025	0.026	0.024	0.024	0.035	0.033	0.045	0.055
1	0.063	0.066	0.057	0.062	0.057	0.061	0.038	0.038	0.041	0.043	0.043	0.039	0.047	0.053
-5	0.197	0.204	0.238	0.251	0.229	0.249	0.022	0.022	0.029	0.028	0.030	0.028	0.042	0.059
-10	0.913	0.917	0.914	0.917	0.917	0.926	0.012	0.027	0.006	0.006	0.542	0.547	0.588	0.592
-15	0.790	0.900	0.484	0.486	0.581	0.797	0.006	0.016	0.002	0.003	0.960	0.954	0.965	0.960
-20	0.142	0.198	0.067	0.067	0.089	0.156	0.002	0.005	0.001	0.001	0.998	0.987	0.998	0.958
-30	0.003	0.004	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.000	1.000	0.994	0.994	0.915
-40	0.141	0.105	0.302	0.395	0.081	0.052	0.139	0.101	0.132	0.082	0.076	0.080	0.075	0.070

Table 16. Finite sample size-adjusted power, AR(2) errors, $c_2 = -0.5c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
$\varphi_1 = \varphi_2 = -0.8$														
5	0.948	0.950	0.914	0.924	0.922	0.932	0.119	0.196	0.006	0.003	0.703	0.742	0.673	0.698
3	0.667	0.673	0.610	0.632	0.614	0.639	0.083	0.162	0.008	0.007	0.024	0.026	0.023	0.045
2	0.299	0.305	0.282	0.280	0.269	0.288	0.026	0.026	0.017	0.018	0.024	0.025	0.018	0.022
1	0.084	0.084	0.088	0.094	0.087	0.091	0.038	0.037	0.028	0.028	0.032	0.033	0.023	0.022
-5	0.258	0.264	0.271	0.285	0.274	0.284	0.033	0.035	0.025	0.027	0.032	0.035	0.022	0.023
-10	0.934	0.935	0.932	0.935	0.934	0.937	0.243	0.391	0.012	0.005	0.568	0.616	0.518	0.569
-15	0.955	0.988	0.805	0.805	0.657	0.853	0.054	0.079	0.004	0.003	0.971	0.972	0.965	0.974
-20	0.203	0.290	0.128	0.128	0.099	0.180	0.010	0.012	0.001	0.001	0.998	0.998	0.998	0.998
-30	0.003	0.004	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	1.000	1.000	1.000	0.995
-40	0.517	0.482	0.367	0.340	0.305	0.284	0.485	0.454	0.474	0.420	0.096	0.117	0.103	0.125
$\varphi_1 = \varphi_2 = -0.5$														
5	0.940	0.939	0.901	0.909	0.919	0.932	0.111	0.188	0.006	0.011	0.705	0.735	0.722	0.739
3	0.636	0.627	0.620	0.641	0.602	0.627	0.069	0.127	0.010	0.011	0.023	0.023	0.064	0.152
2	0.255	0.242	0.269	0.247	0.249	0.251	0.023	0.022	0.023	0.023	0.023	0.017	0.043	0.106
1	0.057	0.046	0.086	0.078	0.081	0.076	0.034	0.030	0.042	0.042	0.035	0.027	0.052	0.059
-5	0.204	0.183	0.288	0.297	0.284	0.291	0.026	0.027	0.038	0.042	0.036	0.030	0.055	0.089
-10	0.919	0.917	0.933	0.937	0.933	0.936	0.237	0.371	0.012	0.022	0.564	0.583	0.608	0.680
-15	0.956	0.987	0.667	0.668	0.651	0.853	0.060	0.095	0.009	0.013	0.970	0.968	0.975	0.981
-20	0.223	0.303	0.101	0.101	0.110	0.198	0.009	0.013	0.001	0.003	0.997	0.997	0.997	0.998
-30	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	1.000	1.000	1.000	0.983
-40	0.456	0.414	0.342	0.335	0.259	0.245	0.428	0.396	0.426	0.379	0.101	0.126	0.112	0.126
$\varphi_1 = \varphi_2 = 0.5$														
5	0.939	0.938	0.814	0.818	0.886	0.902	0.010	0.015	0.004	0.003	0.676	0.693	0.693	0.684
3	0.592	0.584	0.503	0.507	0.534	0.545	0.012	0.015	0.012	0.012	0.023	0.022	0.043	0.041
2	0.205	0.193	0.207	0.206	0.200	0.200	0.018	0.023	0.029	0.029	0.021	0.020	0.033	0.028
1	0.054	0.048	0.075	0.072	0.066	0.062	0.036	0.040	0.045	0.045	0.032	0.030	0.044	0.038
-5	0.189	0.169	0.253	0.241	0.239	0.229	0.029	0.036	0.041	0.042	0.029	0.028	0.042	0.035
-10	0.907	0.903	0.899	0.898	0.907	0.908	0.022	0.031	0.006	0.006	0.525	0.536	0.531	0.520
-15	0.939	0.976	0.374	0.376	0.616	0.824	0.021	0.027	0.001	0.001	0.958	0.825	0.965	0.905
-20	0.211	0.267	0.050	0.050	0.095	0.169	0.006	0.009	0.001	0.001	0.986	0.795	0.966	0.749
-30	0.002	0.004	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.969	0.640	0.879	0.502
-40	0.123	0.065	0.293	0.387	0.055	0.028	0.113	0.060	0.092	0.048	0.065	0.054	0.061	0.041
$\varphi_1 = \varphi_2 = 0.8$														
5	0.867	0.891	0.633	0.637	0.760	0.670	0.002	0.002	0.001	0.001	0.450	0.437	0.477	0.364
3	0.436	0.463	0.328	0.330	0.320	0.217	0.009	0.008	0.008	0.006	0.027	0.029	0.028	0.016
2	0.146	0.149	0.123	0.124	0.091	0.051	0.024	0.022	0.018	0.015	0.021	0.022	0.019	0.009
1	0.049	0.048	0.052	0.053	0.029	0.013	0.034	0.033	0.029	0.021	0.031	0.030	0.024	0.011
-5	0.168	0.174	0.185	0.188	0.124	0.065	0.025	0.024	0.022	0.016	0.021	0.022	0.019	0.010
-10	0.911	0.915	0.816	0.817	0.837	0.768	0.005	0.005	0.004	0.003	0.435	0.447	0.447	0.359
-15	0.631	0.671	0.235	0.236	0.372	0.351	0.000	0.000	0.000	0.000	0.536	0.247	0.579	0.348
-20	0.102	0.109	0.035	0.035	0.047	0.043	0.001	0.001	0.000	0.000	0.595	0.217	0.515	0.198
-30	0.006	0.003	0.005	0.005	0.003	0.001	0.002	0.000	0.002	0.000	0.573	0.158	0.452	0.135
-40	0.030	0.009	0.265	0.391	0.012	0.005	0.028	0.007	0.020	0.007	0.035	0.011	0.025	0.010

Table 17. Finite sample size-adjusted power, AR(1) errors, $c_2 = -0.5c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
$\varphi_1 = -0.8, \varphi_2 = 0$														
5	0.952	0.954	0.927	0.929	0.915	0.934	0.084	0.145	0.003	0.004	0.745	0.784	0.767	0.790
3	0.701	0.712	0.650	0.662	0.604	0.646	0.082	0.164	0.008	0.010	0.050	0.051	0.113	0.222
2	0.305	0.317	0.274	0.254	0.236	0.256	0.026	0.030	0.027	0.027	0.037	0.034	0.074	0.131
1	0.073	0.075	0.066	0.062	0.064	0.071	0.038	0.038	0.047	0.048	0.050	0.052	0.072	0.083
-5	0.293	0.305	0.306	0.305	0.271	0.292	0.028	0.030	0.025	0.025	0.044	0.043	0.081	0.145
-10	0.934	0.936	0.927	0.927	0.923	0.927	0.194	0.316	0.005	0.008	0.607	0.648	0.677	0.738
-15	0.906	0.974	0.968	0.970	0.585	0.790	0.041	0.065	0.003	0.005	0.980	0.981	0.986	0.989
-20	0.152	0.215	0.285	0.289	0.070	0.127	0.007	0.009	0.001	0.001	0.998	0.998	0.998	0.998
-30	0.002	0.003	0.003	0.003	0.001	0.001	0.000	0.000	0.000	0.000	1.000	1.000	1.000	1.000
-40	0.505	0.472	0.345	0.318	0.302	0.273	0.436	0.396	0.427	0.367	0.081	0.100	0.087	0.118
$\varphi_1 = -0.5, \varphi_2 = 0$														
5	0.949	0.951	0.916	0.925	0.905	0.926	0.106	0.201	0.008	0.003	0.739	0.778	0.729	0.752
3	0.664	0.664	0.593	0.624	0.571	0.608	0.075	0.145	0.006	0.007	0.046	0.069	0.061	0.091
2	0.288	0.283	0.227	0.236	0.218	0.234	0.023	0.027	0.015	0.016	0.038	0.056	0.049	0.076
1	0.081	0.086	0.052	0.054	0.056	0.056	0.036	0.041	0.028	0.030	0.050	0.070	0.045	0.062
-5	0.273	0.298	0.233	0.244	0.243	0.260	0.033	0.040	0.024	0.026	0.054	0.074	0.053	0.071
-10	0.933	0.942	0.918	0.923	0.918	0.925	0.228	0.370	0.013	0.007	0.604	0.642	0.602	0.642
-15	0.947	0.991	0.855	0.856	0.608	0.810	0.056	0.087	0.006	0.005	0.970	0.972	0.974	0.978
-20	0.199	0.289	0.149	0.149	0.087	0.162	0.009	0.014	0.002	0.002	0.998	0.998	0.999	0.999
-30	0.002	0.003	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	1.000	1.000	1.000	0.999
-40	0.533	0.493	0.345	0.316	0.312	0.285	0.497	0.453	0.491	0.431	0.095	0.115	0.106	0.127
$\varphi_1 = 0.5, \varphi_2 = 0$														
5	0.930	0.935	0.765	0.784	0.887	0.915	0.002	0.002	0.002	0.002	0.595	0.557	0.656	0.636
3	0.567	0.558	0.442	0.472	0.501	0.524	0.007	0.006	0.006	0.006	0.046	0.060	0.088	0.121
2	0.202	0.200	0.127	0.142	0.155	0.160	0.023	0.021	0.020	0.020	0.041	0.053	0.052	0.078
1	0.082	0.091	0.050	0.056	0.060	0.065	0.033	0.029	0.025	0.025	0.052	0.065	0.047	0.062
-5	0.241	0.265	0.206	0.222	0.229	0.237	0.027	0.028	0.024	0.025	0.044	0.059	0.053	0.075
-10	0.921	0.928	0.880	0.887	0.908	0.916	0.006	0.006	0.005	0.005	0.515	0.514	0.560	0.571
-15	0.791	0.788	0.406	0.414	0.593	0.721	0.003	0.003	0.001	0.001	0.598	0.287	0.663	0.416
-20	0.145	0.146	0.058	0.058	0.087	0.117	0.001	0.001	0.000	0.000	0.546	0.135	0.558	0.242
-30	0.006	0.002	0.005	0.005	0.003	0.003	0.001	0.000	0.002	0.000	0.552	0.099	0.485	0.166
-40	0.019	0.001	0.320	0.437	0.007	0.004	0.017	0.002	0.014	0.008	0.028	0.006	0.024	0.010
$\varphi_1 = 0.8, \varphi_2 = 0$														
5	0.627	0.665	0.624	0.638	0.670	0.693	0.002	0.002	0.002	0.003	0.120	0.111	0.160	0.160
3	0.272	0.293	0.216	0.247	0.299	0.320	0.013	0.014	0.015	0.019	0.041	0.046	0.061	0.075
2	0.109	0.115	0.077	0.082	0.118	0.136	0.029	0.029	0.029	0.033	0.043	0.044	0.046	0.060
1	0.062	0.065	0.052	0.049	0.075	0.098	0.044	0.046	0.047	0.057	0.058	0.061	0.067	0.083
-5	0.152	0.163	0.132	0.135	0.174	0.197	0.023	0.023	0.026	0.029	0.031	0.032	0.038	0.053
-10	0.818	0.846	0.760	0.770	0.828	0.852	0.002	0.002	0.003	0.003	0.186	0.187	0.235	0.265
-15	0.252	0.270	0.119	0.121	0.206	0.240	0.001	0.001	0.000	0.000	0.398	0.392	0.488	0.479
-20	0.036	0.040	0.008	0.008	0.023	0.028	0.000	0.000	0.000	0.000	0.226	0.239	0.281	0.273
-30	0.168	0.100	0.188	0.170	0.120	0.104	0.136	0.065	0.157	0.125	0.115	0.069	0.155	0.121
-40	0.008	0.005	0.438	0.559	0.008	0.010	0.008	0.004	0.011	0.012	0.003	0.001	0.006	0.005

Table 18. Finite sample size-adjusted power, MA(2) errors, $c_2 = 0$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
							$\theta_1 = \theta_2 = -0.8$							
5	0.095	0.209	0.815	0.814	0.000	0.002	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
3	0.030	0.028	0.031	0.031	0.002	0.002	0.000	0.001	0.002	0.002	0.001	0.002	0.002	0.002
2	0.029	0.029	0.036	0.037	0.006	0.006	0.005	0.004	0.002	0.002	0.006	0.006	0.002	0.002
1	0.038	0.031	0.037	0.037	0.025	0.025	0.013	0.013	0.015	0.015	0.015	0.018	0.015	0.015
-5	0.090	0.110	0.213	0.213	0.118	0.120	0.040	0.038	0.062	0.062	0.049	0.050	0.067	0.067
-10	0.072	0.140	0.562	0.563	0.348	0.351	0.101	0.099	0.197	0.197	0.104	0.104	0.222	0.222
-15	0.048	0.135	0.757	0.756	0.494	0.496	0.189	0.198	0.351	0.352	0.180	0.195	0.384	0.384
-20	0.050	0.142	0.803	0.801	0.467	0.468	0.323	0.366	0.391	0.392	0.306	0.350	0.409	0.409
-30	0.071	0.176	0.863	0.861	0.331	0.331	0.642	0.705	0.323	0.322	0.621	0.680	0.324	0.324
-40	0.091	0.189	0.894	0.892	0.201	0.200	0.811	0.915	0.202	0.201	0.803	0.901	0.202	0.201
							$\theta_1 = \theta_2 = -0.5$							
5	0.906	0.769	0.961	0.963	0.940	0.955	0.001	0.001	0.001	0.001	0.130	0.011	0.874	0.912
3	0.401	0.054	0.781	0.779	0.744	0.767	0.007	0.008	0.008	0.008	0.008	0.009	0.256	0.455
2	0.060	0.034	0.382	0.357	0.367	0.358	0.016	0.014	0.014	0.014	0.017	0.013	0.192	0.345
1	0.045	0.036	0.073	0.067	0.077	0.077	0.028	0.031	0.033	0.031	0.028	0.032	0.087	0.116
-5	0.150	0.163	0.168	0.167	0.129	0.119	0.135	0.144	0.116	0.115	0.135	0.138	0.068	0.050
-10	0.381	0.430	0.311	0.315	0.238	0.224	0.322	0.359	0.180	0.182	0.320	0.327	0.113	0.090
-15	0.636	0.714	0.422	0.426	0.332	0.316	0.561	0.626	0.255	0.257	0.561	0.569	0.159	0.127
-20	0.815	0.898	0.520	0.531	0.432	0.414	0.738	0.837	0.315	0.319	0.738	0.777	0.210	0.176
-30	0.959	0.979	0.645	0.655	0.548	0.531	0.912	0.973	0.406	0.410	0.912	0.951	0.323	0.279
-40	0.980	0.984	0.756	0.765	0.650	0.635	0.957	0.990	0.469	0.476	0.955	0.980	0.426	0.381
							$\theta_1 = \theta_2 = 0.5$							
5	0.935	0.951	0.830	0.843	0.886	0.922	0.003	0.006	0.002	0.002	0.772	0.770	0.803	0.803
3	0.651	0.679	0.572	0.599	0.582	0.641	0.006	0.008	0.006	0.005	0.065	0.068	0.104	0.124
2	0.311	0.341	0.270	0.293	0.261	0.292	0.014	0.013	0.014	0.013	0.023	0.025	0.040	0.054
1	0.105	0.113	0.086	0.083	0.085	0.086	0.033	0.030	0.030	0.031	0.039	0.035	0.046	0.056
-5	0.107	0.115	0.128	0.137	0.127	0.136	0.075	0.074	0.102	0.112	0.082	0.079	0.083	0.079
-10	0.219	0.226	0.237	0.267	0.236	0.256	0.115	0.115	0.161	0.182	0.129	0.129	0.121	0.120
-15	0.349	0.358	0.351	0.397	0.330	0.364	0.165	0.171	0.225	0.258	0.178	0.185	0.172	0.177
-20	0.449	0.457	0.448	0.504	0.402	0.443	0.220	0.229	0.269	0.312	0.232	0.246	0.207	0.219
-30	0.635	0.645	0.594	0.668	0.495	0.535	0.331	0.345	0.351	0.397	0.351	0.365	0.263	0.275
-40	0.751	0.763	0.673	0.749	0.550	0.581	0.438	0.456	0.388	0.428	0.460	0.477	0.313	0.322
							$\theta_1 = \theta_2 = 0.8$							
5	0.745	0.821	0.833	0.842	0.786	0.861	0.001	0.001	0.001	0.001	0.769	0.761	0.805	0.807
3	0.450	0.533	0.518	0.558	0.436	0.515	0.005	0.005	0.004	0.006	0.059	0.059	0.101	0.127
2	0.215	0.250	0.217	0.249	0.190	0.223	0.015	0.014	0.016	0.018	0.024	0.027	0.033	0.053
1	0.072	0.081	0.065	0.066	0.066	0.072	0.029	0.028	0.029	0.029	0.033	0.033	0.041	0.047
-5	0.087	0.090	0.106	0.111	0.107	0.120	0.073	0.077	0.092	0.102	0.074	0.084	0.071	0.069
-10	0.148	0.169	0.174	0.198	0.174	0.200	0.090	0.093	0.122	0.144	0.096	0.110	0.093	0.099
-15	0.228	0.269	0.257	0.291	0.248	0.286	0.128	0.147	0.178	0.210	0.141	0.159	0.133	0.139
-20	0.279	0.335	0.306	0.355	0.290	0.326	0.149	0.176	0.215	0.249	0.160	0.195	0.155	0.166
-30	0.387	0.468	0.404	0.478	0.359	0.393	0.194	0.250	0.255	0.306	0.208	0.271	0.184	0.201
-40	0.441	0.542	0.461	0.545	0.384	0.420	0.221	0.294	0.288	0.339	0.248	0.317	0.205	0.225

Table 19. Finite sample size-adjusted power, MA(1) errors, $c_2 = 0$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
$\theta_1 = -0.8, \theta_2 = 0$														
5	0.763	0.820	0.960	0.961	0.958	0.963	0.002	0.012	0.002	0.001	0.030	0.032	0.891	0.930
3	0.051	0.050	0.738	0.741	0.752	0.773	0.010	0.008	0.006	0.006	0.010	0.007	0.393	0.620
2	0.034	0.036	0.274	0.266	0.330	0.335	0.014	0.013	0.012	0.013	0.011	0.014	0.256	0.369
1	0.038	0.037	0.055	0.056	0.083	0.090	0.031	0.026	0.032	0.032	0.030	0.027	0.093	0.118
-5	0.175	0.175	0.170	0.176	0.150	0.140	0.137	0.128	0.117	0.119	0.120	0.106	0.076	0.064
-10	0.428	0.428	0.333	0.344	0.301	0.287	0.334	0.317	0.218	0.223	0.271	0.234	0.137	0.124
-15	0.678	0.676	0.499	0.510	0.444	0.428	0.568	0.551	0.325	0.329	0.471	0.405	0.213	0.187
-20	0.812	0.840	0.623	0.632	0.549	0.536	0.746	0.751	0.410	0.419	0.647	0.602	0.292	0.269
-30	0.912	0.968	0.794	0.803	0.698	0.686	0.917	0.954	0.538	0.546	0.879	0.885	0.428	0.404
-40	0.894	0.991	0.895	0.900	0.788	0.780	0.945	0.992	0.637	0.646	0.931	0.978	0.566	0.543
$\theta_1 = -0.5, \theta_2 = 0$														
5	0.955	0.932	0.918	0.924	0.910	0.933	0.102	0.189	0.008	0.010	0.747	0.686	0.824	0.834
3	0.655	0.538	0.700	0.705	0.631	0.669	0.059	0.076	0.007	0.007	0.042	0.041	0.159	0.277
2	0.259	0.132	0.329	0.301	0.308	0.294	0.017	0.016	0.015	0.016	0.028	0.023	0.121	0.260
1	0.055	0.037	0.069	0.063	0.074	0.070	0.032	0.032	0.034	0.034	0.042	0.035	0.073	0.102
-5	0.159	0.151	0.163	0.167	0.139	0.125	0.131	0.144	0.116	0.118	0.118	0.117	0.071	0.051
-10	0.377	0.388	0.334	0.346	0.276	0.253	0.281	0.346	0.196	0.198	0.246	0.285	0.121	0.091
-15	0.622	0.617	0.446	0.451	0.361	0.329	0.475	0.568	0.262	0.270	0.427	0.490	0.161	0.125
-20	0.806	0.778	0.525	0.525	0.418	0.381	0.665	0.740	0.315	0.320	0.602	0.675	0.195	0.158
-30	0.952	0.944	0.576	0.574	0.458	0.422	0.894	0.933	0.366	0.373	0.859	0.881	0.245	0.200
-40	0.987	0.991	0.621	0.629	0.511	0.474	0.968	0.988	0.389	0.400	0.952	0.968	0.271	0.237
$\theta_1 = 0.5, \theta_2 = 0$														
5	0.954	0.958	0.819	0.838	0.888	0.916	0.013	0.017	0.002	0.002	0.793	0.806	0.801	0.798
3	0.711	0.718	0.579	0.600	0.601	0.647	0.008	0.011	0.004	0.003	0.061	0.067	0.095	0.100
2	0.381	0.380	0.324	0.350	0.303	0.327	0.013	0.014	0.014	0.013	0.027	0.028	0.037	0.048
1	0.104	0.101	0.094	0.106	0.089	0.090	0.030	0.032	0.031	0.030	0.038	0.041	0.044	0.052
-5	0.121	0.129	0.140	0.132	0.137	0.138	0.080	0.085	0.103	0.106	0.092	0.089	0.086	0.081
-10	0.275	0.307	0.284	0.265	0.280	0.284	0.139	0.153	0.181	0.187	0.148	0.152	0.135	0.131
-15	0.457	0.514	0.432	0.416	0.417	0.428	0.235	0.262	0.261	0.273	0.246	0.258	0.198	0.190
-20	0.622	0.676	0.540	0.576	0.502	0.516	0.326	0.376	0.323	0.345	0.342	0.379	0.253	0.250
-30	0.810	0.852	0.711	0.807	0.594	0.620	0.521	0.607	0.410	0.443	0.535	0.594	0.321	0.324
-40	0.906	0.934	0.768	0.853	0.607	0.627	0.663	0.739	0.439	0.470	0.683	0.728	0.359	0.373
$\theta_1 = 0.8, \theta_2 = 0$														
5	0.921	0.947	0.825	0.841	0.881	0.919	0.003	0.010	0.002	0.002	0.774	0.771	0.803	0.804
3	0.664	0.700	0.576	0.613	0.580	0.646	0.007	0.009	0.006	0.008	0.060	0.060	0.100	0.112
2	0.311	0.349	0.287	0.317	0.266	0.309	0.018	0.019	0.019	0.018	0.028	0.030	0.045	0.057
1	0.089	0.095	0.073	0.077	0.071	0.078	0.031	0.029	0.031	0.031	0.037	0.032	0.043	0.051
-5	0.097	0.101	0.118	0.122	0.121	0.135	0.083	0.082	0.099	0.106	0.086	0.082	0.072	0.072
-10	0.210	0.228	0.228	0.250	0.226	0.256	0.111	0.118	0.153	0.172	0.127	0.131	0.116	0.118
-15	0.333	0.367	0.348	0.383	0.330	0.374	0.178	0.196	0.231	0.260	0.196	0.203	0.172	0.171
-20	0.448	0.507	0.445	0.496	0.398	0.451	0.236	0.267	0.284	0.322	0.257	0.283	0.212	0.228
-30	0.620	0.689	0.584	0.679	0.490	0.537	0.352	0.416	0.352	0.396	0.378	0.426	0.267	0.283
-40	0.724	0.782	0.653	0.750	0.523	0.559	0.438	0.532	0.382	0.426	0.468	0.536	0.293	0.308

Table 20. Finite sample size-adjusted power, AR(2) errors, $c_2 = 0$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
$\varphi_1 = \varphi_2 = -0.8$														
5	0.964	0.966	0.920	0.927	0.916	0.939	0.076	0.133	0.002	0.001	0.792	0.825	0.771	0.790
3	0.774	0.779	0.689	0.713	0.676	0.719	0.091	0.180	0.007	0.007	0.050	0.062	0.052	0.075
2	0.468	0.475	0.397	0.389	0.387	0.418	0.031	0.046	0.011	0.011	0.020	0.019	0.015	0.021
1	0.136	0.137	0.129	0.132	0.121	0.130	0.030	0.031	0.025	0.026	0.029	0.029	0.021	0.019
-5	0.139	0.143	0.143	0.155	0.138	0.139	0.088	0.096	0.078	0.079	0.076	0.076	0.045	0.041
-10	0.356	0.384	0.334	0.346	0.291	0.293	0.169	0.194	0.135	0.134	0.152	0.158	0.079	0.068
-15	0.645	0.678	0.492	0.502	0.393	0.395	0.315	0.362	0.191	0.189	0.284	0.299	0.108	0.102
-20	0.841	0.880	0.575	0.578	0.451	0.454	0.483	0.541	0.228	0.229	0.446	0.477	0.131	0.123
-30	0.979	0.996	0.588	0.592	0.465	0.466	0.798	0.865	0.255	0.255	0.773	0.824	0.159	0.149
-40	0.991	0.999	0.600	0.607	0.507	0.514	0.934	0.975	0.287	0.291	0.924	0.967	0.201	0.193
$\varphi_1 = \varphi_2 = -0.5$														
5	0.960	0.960	0.894	0.902	0.914	0.937	0.073	0.125	0.005	0.009	0.792	0.812	0.801	0.810
3	0.738	0.731	0.686	0.699	0.657	0.692	0.081	0.166	0.009	0.009	0.047	0.050	0.096	0.159
2	0.413	0.402	0.389	0.368	0.360	0.374	0.026	0.034	0.016	0.017	0.018	0.017	0.046	0.125
1	0.098	0.087	0.124	0.103	0.113	0.110	0.029	0.027	0.037	0.035	0.030	0.023	0.049	0.067
-5	0.101	0.089	0.177	0.191	0.167	0.172	0.088	0.089	0.119	0.124	0.080	0.060	0.097	0.084
-10	0.274	0.247	0.385	0.413	0.346	0.357	0.160	0.170	0.194	0.215	0.158	0.130	0.160	0.151
-15	0.511	0.475	0.565	0.590	0.494	0.504	0.281	0.306	0.275	0.298	0.273	0.246	0.223	0.206
-20	0.742	0.722	0.668	0.681	0.566	0.567	0.438	0.477	0.334	0.357	0.437	0.412	0.276	0.250
-30	0.951	0.966	0.674	0.675	0.548	0.542	0.751	0.800	0.360	0.382	0.748	0.733	0.293	0.267
-40	0.986	0.996	0.669	0.672	0.552	0.543	0.911	0.957	0.357	0.379	0.910	0.938	0.289	0.269
$\varphi_1 = \varphi_2 = 0.5$														
5	0.954	0.958	0.763	0.769	0.874	0.906	0.006	0.010	0.003	0.003	0.766	0.773	0.785	0.774
3	0.704	0.701	0.527	0.530	0.585	0.615	0.009	0.011	0.009	0.009	0.052	0.053	0.084	0.082
2	0.352	0.344	0.294	0.296	0.284	0.301	0.013	0.016	0.018	0.018	0.016	0.017	0.029	0.027
1	0.085	0.071	0.113	0.110	0.096	0.091	0.031	0.037	0.039	0.039	0.029	0.028	0.041	0.035
-5	0.092	0.083	0.144	0.120	0.130	0.120	0.080	0.096	0.129	0.130	0.067	0.066	0.086	0.074
-10	0.202	0.182	0.291	0.228	0.276	0.251	0.137	0.154	0.200	0.207	0.116	0.106	0.129	0.114
-15	0.368	0.344	0.426	0.305	0.402	0.380	0.218	0.245	0.284	0.291	0.183	0.169	0.189	0.169
-20	0.511	0.486	0.494	0.374	0.500	0.468	0.295	0.331	0.347	0.353	0.257	0.241	0.239	0.210
-30	0.755	0.726	0.586	0.569	0.589	0.552	0.478	0.509	0.446	0.467	0.442	0.396	0.309	0.281
-40	0.858	0.812	0.747	0.801	0.640	0.643	0.619	0.634	0.488	0.541	0.571	0.525	0.356	0.356
$\varphi_1 = \varphi_2 = 0.8$														
5	0.838	0.869	0.557	0.561	0.722	0.630	0.001	0.001	0.001	0.000	0.443	0.403	0.469	0.342
3	0.481	0.512	0.319	0.319	0.339	0.237	0.007	0.006	0.004	0.004	0.061	0.063	0.068	0.043
2	0.208	0.219	0.150	0.151	0.126	0.079	0.016	0.015	0.011	0.008	0.015	0.016	0.015	0.008
1	0.061	0.062	0.060	0.060	0.035	0.014	0.028	0.028	0.024	0.016	0.026	0.026	0.021	0.008
-5	0.080	0.084	0.103	0.104	0.060	0.030	0.078	0.078	0.073	0.055	0.051	0.050	0.039	0.019
-10	0.140	0.149	0.172	0.174	0.105	0.051	0.104	0.104	0.102	0.077	0.076	0.076	0.058	0.031
-15	0.225	0.236	0.257	0.252	0.166	0.084	0.153	0.157	0.140	0.113	0.109	0.111	0.082	0.045
-20	0.278	0.293	0.314	0.299	0.193	0.100	0.192	0.197	0.171	0.139	0.130	0.130	0.095	0.049
-30	0.391	0.416	0.399	0.326	0.259	0.133	0.235	0.259	0.199	0.160	0.175	0.185	0.118	0.062
-40	0.457	0.493	0.441	0.296	0.287	0.157	0.276	0.306	0.229	0.184	0.211	0.234	0.131	0.065

Table 21. Finite sample size-adjusted power, AR(1) errors, $c_2 = 0$

c_1	F^{GLS} AIC	BIC	MAIC	MBIC	MAIC-PQ	MBIC-PQ	F_d^{OLS} AIC	BIC	MAIC	MBIC	F_i^{OLS} AIC	BIC	MAIC	MBIC
							$\varphi_1 = -0.8, \varphi_2 = 0$							
5	0.966	0.966	0.932	0.935	0.911	0.938	0.059	0.098	0.002	0.003	0.825	0.846	0.840	0.854
3	0.791	0.800	0.721	0.734	0.654	0.703	0.083	0.167	0.008	0.008	0.083	0.094	0.152	0.235
2	0.476	0.487	0.392	0.383	0.346	0.382	0.030	0.047	0.015	0.016	0.035	0.034	0.077	0.161
1	0.128	0.134	0.108	0.097	0.096	0.103	0.035	0.036	0.039	0.039	0.045	0.045	0.067	0.087
-5	0.133	0.139	0.101	0.102	0.093	0.095	0.085	0.096	0.097	0.101	0.102	0.106	0.117	0.113
-10	0.324	0.352	0.206	0.208	0.172	0.177	0.168	0.191	0.155	0.160	0.196	0.203	0.200	0.198
-15	0.590	0.628	0.307	0.307	0.250	0.255	0.310	0.348	0.197	0.204	0.336	0.345	0.309	0.306
-20	0.816	0.852	0.401	0.402	0.324	0.329	0.466	0.526	0.232	0.240	0.509	0.526	0.410	0.407
-30	0.973	0.991	0.487	0.487	0.401	0.405	0.782	0.844	0.280	0.291	0.806	0.842	0.572	0.568
-40	0.988	0.999	0.553	0.555	0.481	0.488	0.925	0.970	0.336	0.343	0.944	0.974	0.693	0.690
							$\varphi_1 = -0.5, \varphi_2 = 0$							
5	0.967	0.968	0.928	0.937	0.899	0.934	0.070	0.129	0.005	0.002	0.818	0.846	0.815	0.831
3	0.763	0.764	0.667	0.708	0.622	0.674	0.089	0.203	0.006	0.005	0.068	0.100	0.093	0.118
2	0.445	0.433	0.348	0.360	0.316	0.355	0.025	0.035	0.012	0.012	0.029	0.049	0.049	0.077
1	0.123	0.125	0.078	0.079	0.077	0.079	0.032	0.037	0.025	0.026	0.045	0.067	0.047	0.065
-5	0.176	0.216	0.108	0.122	0.095	0.100	0.101	0.126	0.088	0.095	0.111	0.138	0.075	0.069
-10	0.403	0.500	0.230	0.255	0.192	0.199	0.192	0.256	0.138	0.157	0.212	0.269	0.116	0.109
-15	0.630	0.732	0.349	0.366	0.265	0.268	0.334	0.449	0.180	0.205	0.359	0.454	0.150	0.145
-20	0.812	0.872	0.425	0.452	0.332	0.336	0.510	0.635	0.231	0.252	0.527	0.631	0.191	0.181
-30	0.959	0.979	0.495	0.520	0.393	0.402	0.759	0.871	0.275	0.306	0.776	0.859	0.248	0.243
-40	0.990	0.997	0.547	0.564	0.458	0.468	0.908	0.962	0.300	0.335	0.910	0.956	0.301	0.297
							$\varphi_1 = 0.5, \varphi_2 = 0$							
5	0.929	0.933	0.723	0.743	0.872	0.907	0.002	0.001	0.001	0.001	0.626	0.543	0.682	0.632
3	0.645	0.634	0.466	0.488	0.541	0.575	0.006	0.005	0.004	0.004	0.086	0.101	0.135	0.169
2	0.303	0.293	0.177	0.199	0.224	0.225	0.014	0.013	0.012	0.012	0.037	0.049	0.054	0.084
1	0.102	0.105	0.061	0.066	0.079	0.080	0.032	0.027	0.023	0.023	0.050	0.064	0.051	0.070
-5	0.163	0.204	0.121	0.132	0.138	0.153	0.092	0.091	0.090	0.090	0.103	0.109	0.085	0.086
-10	0.295	0.375	0.233	0.248	0.259	0.278	0.151	0.161	0.139	0.141	0.161	0.174	0.118	0.119
-15	0.438	0.533	0.333	0.351	0.349	0.375	0.217	0.247	0.196	0.194	0.223	0.262	0.165	0.162
-20	0.541	0.641	0.419	0.418	0.429	0.455	0.280	0.320	0.234	0.239	0.293	0.337	0.196	0.196
-30	0.704	0.791	0.526	0.491	0.514	0.528	0.399	0.463	0.303	0.303	0.407	0.474	0.248	0.245
-40	0.799	0.867	0.598	0.504	0.559	0.571	0.496	0.565	0.333	0.329	0.507	0.573	0.290	0.277
							$\varphi_1 = 0.8, \varphi_2 = 0$							
5	0.529	0.565	0.486	0.497	0.568	0.594	0.002	0.001	0.002	0.002	0.114	0.104	0.146	0.137
3	0.262	0.279	0.194	0.221	0.273	0.299	0.008	0.008	0.008	0.010	0.067	0.072	0.088	0.099
2	0.132	0.139	0.084	0.092	0.135	0.155	0.021	0.023	0.024	0.026	0.036	0.038	0.040	0.051
1	0.067	0.072	0.052	0.049	0.079	0.100	0.037	0.037	0.038	0.048	0.049	0.053	0.057	0.074
-5	0.078	0.084	0.080	0.078	0.115	0.145	0.093	0.093	0.095	0.108	0.091	0.088	0.093	0.113
-10	0.114	0.123	0.110	0.109	0.142	0.173	0.095	0.096	0.102	0.114	0.099	0.095	0.091	0.104
-15	0.146	0.162	0.144	0.144	0.171	0.196	0.127	0.129	0.125	0.134	0.111	0.107	0.096	0.105
-20	0.172	0.188	0.162	0.162	0.185	0.206	0.126	0.134	0.133	0.138	0.115	0.119	0.110	0.113
-30	0.203	0.238	0.199	0.199	0.214	0.236	0.140	0.153	0.142	0.145	0.132	0.139	0.110	0.113
-40	0.228	0.276	0.203	0.204	0.221	0.238	0.156	0.175	0.147	0.154	0.140	0.161	0.112	0.116

Table 22. Finite sample size-adjusted power, MA(2) errors, $c_2 = 0.5c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
$\theta_1 = \theta_2 = -0.8$														
5	0.081	0.179	0.908	0.907	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	0.020	0.018	0.017	0.017	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.026	0.023	0.026	0.026	0.003	0.003	0.002	0.002	0.001	0.001	0.003	0.003	0.001	0.001
1	0.034	0.029	0.030	0.031	0.019	0.020	0.009	0.007	0.011	0.011	0.010	0.012	0.011	0.011
-5	0.102	0.143	0.301	0.303	0.184	0.186	0.049	0.050	0.092	0.093	0.056	0.060	0.105	0.105
-10	0.117	0.233	0.717	0.717	0.290	0.292	0.179	0.190	0.212	0.213	0.152	0.161	0.199	0.200
-15	0.234	0.410	0.800	0.801	0.285	0.286	0.333	0.354	0.233	0.235	0.285	0.285	0.214	0.214
-20	0.447	0.657	0.716	0.716	0.253	0.252	0.513	0.541	0.225	0.224	0.457	0.465	0.211	0.210
-30	0.852	0.962	0.320	0.320	0.165	0.165	0.783	0.854	0.135	0.135	0.751	0.808	0.133	0.132
-40	0.877	0.968	0.132	0.132	0.107	0.107	0.801	0.939	0.055	0.055	0.792	0.930	0.053	0.053
$\theta_1 = \theta_2 = -0.5$														
5	0.944	0.818	0.975	0.974	0.942	0.962	0.001	0.000	0.002	0.001	0.347	0.104	0.936	0.954
3	0.628	0.149	0.852	0.853	0.787	0.826	0.003	0.004	0.004	0.004	0.003	0.004	0.366	0.520
2	0.160	0.026	0.583	0.566	0.538	0.546	0.008	0.007	0.006	0.006	0.008	0.009	0.221	0.430
1	0.041	0.032	0.117	0.102	0.125	0.113	0.021	0.023	0.024	0.024	0.021	0.025	0.117	0.178
-5	0.207	0.231	0.328	0.333	0.269	0.252	0.170	0.183	0.142	0.140	0.170	0.171	0.073	0.058
-10	0.553	0.653	0.681	0.692	0.617	0.597	0.466	0.535	0.293	0.300	0.465	0.444	0.166	0.133
-15	0.825	0.901	0.879	0.886	0.848	0.833	0.730	0.827	0.460	0.467	0.728	0.742	0.281	0.242
-20	0.925	0.978	0.963	0.966	0.952	0.946	0.852	0.953	0.613	0.620	0.850	0.907	0.439	0.388
-30	0.986	0.995	0.996	0.996	0.995	0.994	0.946	0.993	0.831	0.838	0.944	0.988	0.732	0.687
-40	0.994	0.998	0.999	0.999	0.998	0.998	0.975	0.997	0.943	0.946	0.971	0.997	0.900	0.875
$\theta_1 = \theta_2 = 0.5$														
5	0.944	0.962	0.825	0.837	0.875	0.930	0.002	0.005	0.000	0.000	0.882	0.872	0.900	0.893
3	0.764	0.789	0.644	0.666	0.652	0.729	0.003	0.007	0.002	0.003	0.187	0.195	0.253	0.271
2	0.486	0.517	0.400	0.435	0.388	0.444	0.009	0.010	0.009	0.008	0.019	0.024	0.043	0.057
1	0.159	0.173	0.124	0.129	0.119	0.128	0.023	0.024	0.023	0.022	0.030	0.031	0.042	0.053
-5	0.196	0.197	0.269	0.295	0.254	0.270	0.084	0.083	0.123	0.135	0.098	0.097	0.092	0.089
-10	0.536	0.539	0.662	0.721	0.624	0.662	0.185	0.181	0.254	0.288	0.192	0.189	0.185	0.189
-15	0.812	0.818	0.874	0.911	0.836	0.863	0.352	0.360	0.428	0.484	0.333	0.343	0.310	0.320
-20	0.938	0.953	0.943	0.963	0.906	0.925	0.545	0.550	0.566	0.622	0.508	0.516	0.431	0.445
-30	0.996	0.998	0.980	0.985	0.963	0.967	0.825	0.852	0.725	0.757	0.788	0.817	0.600	0.604
-40	1.000	1.000	0.993	0.995	0.988	0.989	0.951	0.971	0.811	0.835	0.935	0.958	0.703	0.702
$\theta_1 = \theta_2 = 0.8$														
5	0.736	0.821	0.828	0.838	0.726	0.833	0.001	0.001	0.001	0.000	0.880	0.871	0.899	0.900
3	0.508	0.612	0.588	0.627	0.454	0.558	0.005	0.007	0.005	0.004	0.182	0.178	0.259	0.279
2	0.312	0.366	0.319	0.364	0.254	0.311	0.011	0.011	0.011	0.011	0.024	0.029	0.040	0.061
1	0.103	0.118	0.089	0.094	0.083	0.093	0.026	0.023	0.021	0.021	0.031	0.027	0.036	0.047
-5	0.156	0.165	0.235	0.251	0.224	0.243	0.083	0.082	0.118	0.131	0.088	0.091	0.084	0.083
-10	0.383	0.426	0.543	0.604	0.481	0.527	0.132	0.151	0.200	0.237	0.140	0.164	0.135	0.141
-15	0.625	0.677	0.783	0.844	0.716	0.764	0.238	0.287	0.341	0.398	0.237	0.284	0.231	0.246
-20	0.773	0.831	0.892	0.926	0.837	0.868	0.350	0.420	0.454	0.520	0.329	0.402	0.319	0.347
-30	0.938	0.970	0.971	0.977	0.949	0.958	0.571	0.674	0.651	0.711	0.542	0.642	0.503	0.533
-40	0.980	0.994	0.989	0.991	0.979	0.982	0.719	0.827	0.765	0.806	0.690	0.800	0.635	0.659

Table 23. Finite sample size-adjusted power, MA(1) errors, $c_2 = 0.5c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	BIC	$MAIC$	$MBIC$	$MAIC$-PQ	$MBIC$-PQ	AIC	BIC	$MAIC$	$MBIC$	AIC	BIC	$MAIC$	$MBIC$
							$\theta_1 = -0.8, \theta_2 = 0$							
5	0.750	0.900	0.975	0.975	0.962	0.971	0.000	0.011	0.001	0.002	0.149	0.201	0.940	0.959
3	0.127	0.174	0.834	0.837	0.830	0.851	0.005	0.004	0.002	0.002	0.003	0.004	0.468	0.653
2	0.024	0.024	0.486	0.483	0.526	0.541	0.010	0.008	0.010	0.010	0.008	0.008	0.355	0.535
1	0.034	0.032	0.072	0.073	0.112	0.114	0.024	0.020	0.024	0.024	0.021	0.021	0.129	0.186
-5	0.249	0.259	0.303	0.314	0.299	0.284	0.172	0.159	0.147	0.150	0.142	0.128	0.087	0.075
-10	0.618	0.636	0.655	0.672	0.674	0.660	0.474	0.457	0.338	0.346	0.363	0.299	0.192	0.170
-15	0.842	0.883	0.883	0.896	0.903	0.895	0.736	0.751	0.550	0.561	0.613	0.557	0.355	0.327
-20	0.908	0.966	0.967	0.972	0.975	0.972	0.850	0.911	0.705	0.715	0.787	0.783	0.534	0.500
-30	0.952	0.993	0.997	0.997	0.997	0.997	0.924	0.984	0.912	0.918	0.910	0.975	0.815	0.794
-40	0.976	0.997	1.000	1.000	1.000	1.000	0.953	0.991	0.974	0.975	0.938	0.987	0.945	0.935
							$\theta_1 = -0.5, \theta_2 = 0$							
5	0.978	0.970	0.950	0.951	0.903	0.943	0.062	0.114	0.004	0.005	0.871	0.838	0.912	0.915
3	0.789	0.724	0.791	0.798	0.695	0.743	0.088	0.180	0.005	0.006	0.109	0.077	0.283	0.350
2	0.467	0.316	0.521	0.508	0.455	0.474	0.017	0.016	0.013	0.012	0.025	0.028	0.144	0.293
1	0.082	0.042	0.110	0.094	0.118	0.103	0.023	0.023	0.023	0.024	0.034	0.029	0.090	0.152
-5	0.246	0.221	0.316	0.326	0.290	0.264	0.167	0.180	0.144	0.148	0.145	0.148	0.084	0.060
-10	0.664	0.583	0.690	0.703	0.650	0.614	0.437	0.507	0.308	0.317	0.355	0.409	0.180	0.142
-15	0.922	0.831	0.839	0.848	0.818	0.793	0.754	0.781	0.469	0.481	0.645	0.676	0.293	0.242
-20	0.987	0.964	0.924	0.928	0.913	0.894	0.926	0.934	0.591	0.598	0.853	0.847	0.397	0.343
-30	0.999	0.999	0.982	0.984	0.981	0.977	0.995	0.998	0.767	0.779	0.985	0.987	0.603	0.545
-40	1.000	1.000	0.996	0.997	0.995	0.994	0.999	1.000	0.879	0.888	0.997	1.000	0.773	0.730
							$\theta_1 = 0.5, \theta_2 = 0$							
5	0.971	0.977	0.798	0.815	0.877	0.929	0.009	0.011	0.001	0.001	0.895	0.889	0.898	0.893
3	0.831	0.835	0.638	0.657	0.674	0.741	0.007	0.011	0.005	0.004	0.191	0.209	0.242	0.249
2	0.571	0.570	0.447	0.468	0.435	0.476	0.010	0.010	0.008	0.008	0.023	0.025	0.038	0.043
1	0.175	0.165	0.159	0.174	0.143	0.148	0.022	0.026	0.023	0.022	0.034	0.036	0.045	0.050
-5	0.231	0.244	0.289	0.296	0.276	0.283	0.096	0.101	0.129	0.132	0.108	0.103	0.099	0.095
-10	0.639	0.672	0.725	0.749	0.698	0.708	0.224	0.255	0.293	0.302	0.231	0.237	0.208	0.204
-15	0.896	0.921	0.902	0.944	0.878	0.893	0.477	0.530	0.496	0.523	0.447	0.469	0.356	0.354
-20	0.982	0.988	0.959	0.980	0.927	0.934	0.716	0.767	0.632	0.661	0.672	0.697	0.498	0.498
-30	1.000	1.000	0.982	0.987	0.967	0.967	0.950	0.972	0.751	0.757	0.928	0.943	0.628	0.617
-40	1.000	1.000	0.995	0.995	0.990	0.989	0.993	0.998	0.824	0.829	0.988	0.995	0.716	0.701
							$\theta_1 = 0.8, \theta_2 = 0$							
5	0.936	0.968	0.826	0.838	0.863	0.924	0.003	0.006	0.000	0.001	0.875	0.871	0.894	0.890
3	0.772	0.816	0.635	0.658	0.632	0.717	0.006	0.009	0.004	0.004	0.194	0.196	0.260	0.275
2	0.472	0.522	0.412	0.443	0.391	0.458	0.012	0.014	0.010	0.012	0.025	0.029	0.047	0.060
1	0.137	0.155	0.114	0.128	0.109	0.120	0.025	0.022	0.023	0.024	0.030	0.027	0.042	0.056
-5	0.184	0.194	0.259	0.283	0.253	0.273	0.095	0.095	0.128	0.136	0.102	0.098	0.090	0.087
-10	0.507	0.538	0.646	0.701	0.610	0.662	0.191	0.207	0.261	0.291	0.200	0.198	0.184	0.193
-15	0.804	0.830	0.882	0.922	0.841	0.875	0.353	0.387	0.441	0.489	0.347	0.357	0.309	0.316
-20	0.923	0.947	0.937	0.962	0.912	0.930	0.554	0.618	0.578	0.632	0.529	0.564	0.431	0.452
-30	0.992	0.998	0.982	0.987	0.973	0.976	0.830	0.893	0.743	0.766	0.806	0.854	0.608	0.612
-40	0.999	1.000	0.992	0.994	0.988	0.989	0.945	0.982	0.822	0.838	0.929	0.965	0.710	0.702

Table 24. Finite sample size-adjusted power, AR(2) errors, $c_2 = 0.5c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
$\varphi_1 = \varphi_2 = -0.8$														
5	0.980	0.981	0.945	0.948	0.912	0.948	0.045	0.073	0.002	0.001	0.895	0.914	0.882	0.888
3	0.868	0.871	0.787	0.812	0.731	0.790	0.090	0.175	0.006	0.004	0.194	0.229	0.190	0.218
2	0.647	0.652	0.528	0.554	0.513	0.556	0.057	0.105	0.008	0.007	0.017	0.017	0.016	0.030
1	0.233	0.239	0.211	0.208	0.197	0.211	0.027	0.028	0.020	0.020	0.024	0.025	0.018	0.019
-5	0.283	0.297	0.309	0.327	0.297	0.308	0.111	0.122	0.094	0.095	0.090	0.092	0.049	0.046
-10	0.796	0.834	0.728	0.739	0.690	0.698	0.295	0.335	0.207	0.212	0.233	0.242	0.112	0.103
-15	0.989	0.995	0.877	0.882	0.851	0.852	0.640	0.697	0.357	0.360	0.528	0.549	0.202	0.189
-20	0.999	1.000	0.932	0.936	0.925	0.926	0.886	0.930	0.465	0.466	0.798	0.831	0.300	0.279
-30	1.000	1.000	0.981	0.983	0.981	0.981	0.995	0.999	0.631	0.639	0.989	0.998	0.468	0.453
-40	1.000	1.000	0.996	0.997	0.997	0.997	0.999	1.000	0.772	0.779	0.996	1.000	0.665	0.652
$\varphi_1 = \varphi_2 = -0.5$														
5	0.978	0.978	0.919	0.921	0.911	0.946	0.044	0.069	0.003	0.004	0.892	0.903	0.898	0.904
3	0.845	0.840	0.763	0.772	0.713	0.766	0.087	0.171	0.005	0.005	0.182	0.194	0.253	0.296
2	0.602	0.591	0.540	0.548	0.491	0.528	0.043	0.080	0.010	0.011	0.017	0.018	0.054	0.128
1	0.186	0.170	0.194	0.156	0.180	0.165	0.022	0.023	0.028	0.026	0.026	0.020	0.043	0.091
-5	0.209	0.183	0.358	0.385	0.346	0.354	0.103	0.106	0.142	0.154	0.092	0.076	0.117	0.105
-10	0.687	0.642	0.811	0.834	0.781	0.790	0.273	0.296	0.310	0.343	0.240	0.205	0.244	0.223
-15	0.962	0.958	0.915	0.924	0.887	0.890	0.583	0.620	0.495	0.528	0.516	0.469	0.372	0.349
-20	0.997	0.998	0.950	0.955	0.938	0.938	0.861	0.895	0.597	0.616	0.795	0.768	0.471	0.442
-30	1.000	1.000	0.985	0.987	0.983	0.983	0.990	0.999	0.717	0.741	0.986	0.992	0.604	0.584
-40	1.000	1.000	0.995	0.996	0.994	0.995	0.998	1.000	0.827	0.850	0.998	1.000	0.748	0.731
$\varphi_1 = \varphi_2 = 0.5$														
5	0.974	0.978	0.724	0.731	0.870	0.922	0.005	0.006	0.001	0.001	0.862	0.794	0.878	0.827
3	0.825	0.826	0.565	0.568	0.656	0.709	0.007	0.009	0.006	0.006	0.177	0.194	0.222	0.224
2	0.545	0.544	0.389	0.391	0.414	0.441	0.007	0.008	0.010	0.009	0.012	0.009	0.029	0.026
1	0.154	0.141	0.160	0.162	0.141	0.136	0.022	0.029	0.030	0.031	0.022	0.021	0.035	0.029
-5	0.179	0.158	0.292	0.264	0.268	0.245	0.096	0.113	0.155	0.158	0.079	0.078	0.100	0.084
-10	0.559	0.527	0.708	0.658	0.686	0.663	0.220	0.251	0.319	0.325	0.172	0.163	0.201	0.183
-15	0.874	0.857	0.892	0.885	0.873	0.862	0.457	0.496	0.529	0.543	0.367	0.336	0.342	0.319
-20	0.977	0.970	0.955	0.972	0.926	0.931	0.694	0.734	0.670	0.691	0.573	0.548	0.482	0.455
-30	0.999	0.999	0.981	0.989	0.962	0.961	0.943	0.955	0.782	0.804	0.893	0.870	0.622	0.617
-40	1.000	1.000	0.993	0.994	0.985	0.982	0.992	0.997	0.837	0.840	0.983	0.983	0.697	0.672
$\varphi_1 = \varphi_2 = 0.8$														
5	0.790	0.818	0.494	0.497	0.662	0.586	0.000	0.000	0.000	0.000	0.355	0.230	0.344	0.187
3	0.544	0.578	0.309	0.313	0.373	0.275	0.006	0.006	0.005	0.004	0.159	0.169	0.175	0.129
2	0.308	0.319	0.194	0.195	0.187	0.126	0.010	0.010	0.008	0.006	0.018	0.017	0.018	0.009
1	0.089	0.092	0.075	0.076	0.049	0.023	0.020	0.021	0.017	0.012	0.019	0.020	0.018	0.009
-5	0.154	0.167	0.203	0.207	0.124	0.059	0.100	0.103	0.096	0.077	0.061	0.060	0.050	0.025
-10	0.408	0.440	0.499	0.507	0.343	0.191	0.170	0.177	0.165	0.130	0.114	0.114	0.087	0.048
-15	0.684	0.720	0.761	0.762	0.593	0.400	0.305	0.324	0.285	0.237	0.195	0.202	0.151	0.088
-20	0.855	0.885	0.865	0.862	0.747	0.574	0.459	0.488	0.406	0.344	0.305	0.316	0.228	0.134
-30	0.979	0.987	0.941	0.950	0.873	0.764	0.729	0.771	0.585	0.514	0.540	0.569	0.367	0.233
-40	0.997	0.998	0.964	0.979	0.898	0.819	0.893	0.919	0.676	0.617	0.763	0.795	0.458	0.329

Table 25. Finite sample size-adjusted power, AR(1) errors, $c_2 = 0.5c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
							$\varphi_1 = -0.8, \varphi_2 = 0$							
5	0.982	0.983	0.962	0.963	0.910	0.948	0.035	0.056	0.001	0.002	0.909	0.919	0.912	0.922
3	0.883	0.887	0.810	0.821	0.719	0.781	0.072	0.139	0.004	0.004	0.243	0.271	0.311	0.367
2	0.663	0.674	0.549	0.556	0.483	0.530	0.045	0.088	0.009	0.009	0.038	0.036	0.094	0.181
1	0.229	0.237	0.183	0.152	0.161	0.173	0.031	0.031	0.030	0.029	0.040	0.038	0.065	0.109
-5	0.251	0.275	0.217	0.220	0.190	0.195	0.110	0.122	0.114	0.119	0.121	0.122	0.130	0.128
-10	0.757	0.794	0.533	0.533	0.493	0.498	0.286	0.329	0.225	0.233	0.276	0.284	0.265	0.262
-15	0.977	0.990	0.778	0.779	0.757	0.763	0.619	0.676	0.354	0.365	0.564	0.579	0.473	0.468
-20	0.999	1.000	0.901	0.901	0.894	0.895	0.872	0.920	0.475	0.487	0.828	0.848	0.644	0.641
-30	1.000	1.000	0.980	0.980	0.979	0.979	0.995	0.999	0.687	0.700	0.994	0.998	0.858	0.856
-40	1.000	1.000	0.993	0.993	0.992	0.993	0.999	1.000	0.838	0.846	0.999	1.000	0.951	0.951
							$\varphi_1 = -0.5, \varphi_2 = 0$							
5	0.982	0.983	0.959	0.960	0.893	0.942	0.042	0.069	0.004	0.001	0.909	0.921	0.909	0.919
3	0.856	0.856	0.780	0.803	0.686	0.754	0.090	0.197	0.005	0.004	0.209	0.258	0.249	0.280
2	0.631	0.626	0.514	0.529	0.453	0.506	0.042	0.087	0.007	0.008	0.032	0.051	0.056	0.083
1	0.212	0.206	0.140	0.146	0.133	0.141	0.025	0.028	0.018	0.021	0.040	0.059	0.052	0.073
-5	0.319	0.376	0.235	0.260	0.217	0.222	0.121	0.155	0.103	0.115	0.134	0.162	0.086	0.079
-10	0.784	0.842	0.606	0.643	0.559	0.570	0.324	0.426	0.224	0.248	0.312	0.392	0.176	0.168
-15	0.976	0.986	0.792	0.816	0.760	0.772	0.632	0.752	0.356	0.388	0.593	0.688	0.278	0.268
-20	0.997	0.999	0.899	0.913	0.893	0.897	0.868	0.931	0.477	0.519	0.828	0.892	0.391	0.383
-30	1.000	1.000	0.974	0.979	0.976	0.978	0.994	0.999	0.673	0.713	0.988	0.996	0.632	0.626
-40	1.000	1.000	0.994	0.995	0.995	0.995	0.999	1.000	0.808	0.839	0.999	1.000	0.811	0.807
							$\varphi_1 = 0.5, \varphi_2 = 0$							
5	0.930	0.918	0.707	0.722	0.848	0.882	0.001	0.000	0.000	0.000	0.555	0.360	0.598	0.445
3	0.747	0.727	0.505	0.528	0.601	0.649	0.003	0.003	0.002	0.002	0.211	0.225	0.271	0.302
2	0.466	0.444	0.272	0.295	0.333	0.345	0.011	0.009	0.009	0.009	0.039	0.050	0.063	0.097
1	0.148	0.146	0.081	0.090	0.106	0.101	0.025	0.019	0.018	0.018	0.043	0.057	0.051	0.078
-5	0.274	0.330	0.245	0.265	0.266	0.293	0.110	0.114	0.109	0.111	0.116	0.124	0.096	0.099
-10	0.640	0.711	0.606	0.636	0.623	0.647	0.240	0.263	0.225	0.227	0.233	0.256	0.174	0.173
-15	0.872	0.912	0.826	0.845	0.828	0.844	0.432	0.489	0.374	0.376	0.393	0.440	0.288	0.286
-20	0.965	0.979	0.902	0.915	0.897	0.901	0.623	0.682	0.510	0.510	0.571	0.619	0.405	0.395
-30	0.998	0.999	0.955	0.966	0.950	0.950	0.875	0.904	0.666	0.661	0.826	0.864	0.554	0.543
-40	0.999	1.000	0.978	0.988	0.978	0.977	0.969	0.981	0.747	0.736	0.945	0.964	0.643	0.628
							$\varphi_1 = 0.8, \varphi_2 = 0$							
5	0.445	0.466	0.288	0.293	0.465	0.491	0.001	0.001	0.001	0.001	0.139	0.125	0.178	0.169
3	0.261	0.276	0.166	0.183	0.257	0.285	0.005	0.006	0.007	0.007	0.103	0.107	0.135	0.137
2	0.168	0.180	0.092	0.105	0.161	0.184	0.013	0.013	0.015	0.016	0.037	0.040	0.045	0.053
1	0.078	0.083	0.055	0.055	0.086	0.103	0.028	0.026	0.028	0.035	0.042	0.046	0.052	0.066
-5	0.149	0.161	0.157	0.156	0.200	0.229	0.105	0.106	0.115	0.131	0.099	0.098	0.100	0.121
-10	0.297	0.327	0.317	0.317	0.346	0.365	0.135	0.140	0.144	0.154	0.121	0.115	0.113	0.123
-15	0.499	0.537	0.511	0.513	0.530	0.541	0.206	0.217	0.219	0.227	0.176	0.178	0.153	0.156
-20	0.627	0.672	0.639	0.645	0.651	0.658	0.269	0.292	0.279	0.283	0.220	0.225	0.190	0.191
-30	0.835	0.874	0.803	0.807	0.804	0.808	0.418	0.462	0.392	0.392	0.330	0.358	0.267	0.260
-40	0.924	0.949	0.867	0.869	0.864	0.871	0.551	0.612	0.500	0.502	0.445	0.493	0.351	0.346

Table 26. Finite sample size-adjusted power, MA(2) errors, $c_2 = c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
$\theta_1 = \theta_2 = -0.8$														
5	0.128	0.228	0.921	0.922	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.015
3	0.012	0.013	0.028	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.020	0.019	0.021	0.021	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
1	0.029	0.025	0.025	0.025	0.010	0.010	0.005	0.004	0.005	0.005	0.006	0.007	0.005	0.005
-5	0.105	0.171	0.465	0.465	0.271	0.273	0.075	0.080	0.154	0.155	0.071	0.082	0.169	0.169
-10	0.202	0.370	0.787	0.788	0.262	0.262	0.290	0.290	0.207	0.208	0.233	0.230	0.184	0.183
-15	0.506	0.708	0.658	0.658	0.218	0.218	0.518	0.531	0.197	0.197	0.452	0.453	0.186	0.185
-20	0.818	0.936	0.355	0.354	0.159	0.159	0.726	0.770	0.133	0.133	0.683	0.706	0.131	0.130
-30	0.866	0.965	0.096	0.096	0.081	0.081	0.788	0.939	0.041	0.041	0.780	0.929	0.041	0.041
-40	0.791	0.949	0.131	0.130	0.113	0.114	0.610	0.863	0.024	0.024	0.594	0.856	0.021	0.021
$\theta_1 = \theta_2 = -0.5$														
5	0.887	0.937	0.858	0.862	0.885	0.966	0.003	0.003	0.001	0.001	0.627	0.383	0.981	0.985
3	0.825	0.431	0.924	0.921	0.854	0.893	0.001	0.002	0.003	0.002	0.004	0.002	0.696	0.760
2	0.432	0.048	0.770	0.764	0.698	0.739	0.004	0.005	0.005	0.005	0.005	0.006	0.237	0.437
1	0.044	0.029	0.227	0.200	0.228	0.201	0.017	0.017	0.017	0.017	0.017	0.018	0.161	0.272
-5	0.297	0.347	0.472	0.482	0.410	0.390	0.251	0.276	0.194	0.194	0.250	0.242	0.098	0.076
-10	0.746	0.840	0.861	0.867	0.824	0.810	0.633	0.748	0.427	0.431	0.633	0.637	0.255	0.216
-15	0.923	0.976	0.971	0.973	0.961	0.958	0.854	0.949	0.647	0.653	0.853	0.903	0.458	0.409
-20	0.972	0.993	0.996	0.996	0.993	0.992	0.925	0.989	0.813	0.817	0.922	0.980	0.699	0.642
-30	0.996	0.998	0.999	0.999	0.999	0.999	0.970	0.996	0.964	0.966	0.965	0.996	0.936	0.914
-40	0.998	0.999	1.000	1.000	1.000	0.999	0.989	0.998	0.994	0.994	0.987	0.997	0.985	0.978
$\theta_1 = \theta_2 = 0.5$														
5	0.753	0.798	0.586	0.610	0.761	0.850	0.002	0.002	0.001	0.001	0.962	0.944	0.965	0.909
3	0.868	0.895	0.734	0.746	0.743	0.829	0.003	0.006	0.001	0.002	0.526	0.526	0.589	0.599
2	0.661	0.693	0.543	0.578	0.531	0.612	0.007	0.009	0.005	0.005	0.064	0.068	0.102	0.117
1	0.231	0.259	0.194	0.209	0.181	0.201	0.017	0.019	0.015	0.017	0.021	0.023	0.040	0.055
-5	0.315	0.318	0.428	0.474	0.406	0.435	0.112	0.112	0.167	0.182	0.117	0.121	0.120	0.114
-10	0.773	0.782	0.857	0.902	0.816	0.844	0.299	0.304	0.393	0.446	0.292	0.296	0.283	0.292
-15	0.955	0.961	0.952	0.968	0.927	0.937	0.585	0.598	0.607	0.663	0.542	0.559	0.466	0.481
-20	0.994	0.996	0.978	0.984	0.966	0.967	0.793	0.811	0.715	0.749	0.753	0.771	0.589	0.597
-30	0.999	1.000	0.993	0.995	0.991	0.991	0.971	0.984	0.835	0.853	0.957	0.973	0.737	0.729
-40	1.000	1.000	0.999	0.999	0.998	0.998	0.996	0.999	0.912	0.924	0.993	0.997	0.839	0.836
$\theta_1 = \theta_2 = 0.8$														
5	0.488	0.572	0.629	0.645	0.600	0.726	0.002	0.001	0.000	0.000	0.962	0.960	0.968	0.967
3	0.588	0.692	0.692	0.716	0.509	0.641	0.002	0.003	0.002	0.002	0.535	0.509	0.607	0.607
2	0.427	0.504	0.469	0.515	0.354	0.443	0.006	0.006	0.006	0.007	0.066	0.069	0.110	0.131
1	0.148	0.173	0.138	0.155	0.118	0.137	0.019	0.019	0.018	0.019	0.023	0.027	0.037	0.049
-5	0.237	0.252	0.354	0.395	0.336	0.368	0.101	0.107	0.146	0.167	0.103	0.116	0.098	0.101
-10	0.575	0.626	0.737	0.807	0.675	0.725	0.211	0.248	0.303	0.358	0.209	0.242	0.207	0.225
-15	0.819	0.871	0.926	0.949	0.871	0.898	0.384	0.457	0.485	0.561	0.360	0.430	0.348	0.373
-20	0.926	0.956	0.966	0.977	0.941	0.951	0.535	0.641	0.625	0.685	0.503	0.607	0.481	0.507
-30	0.987	0.996	0.991	0.993	0.986	0.988	0.774	0.870	0.809	0.842	0.748	0.843	0.697	0.711
-40	0.996	0.999	0.997	0.998	0.995	0.996	0.886	0.954	0.892	0.913	0.866	0.946	0.806	0.815

Table 27. Finite sample size-adjusted power, MA(1) errors, $c_2 = c_1$

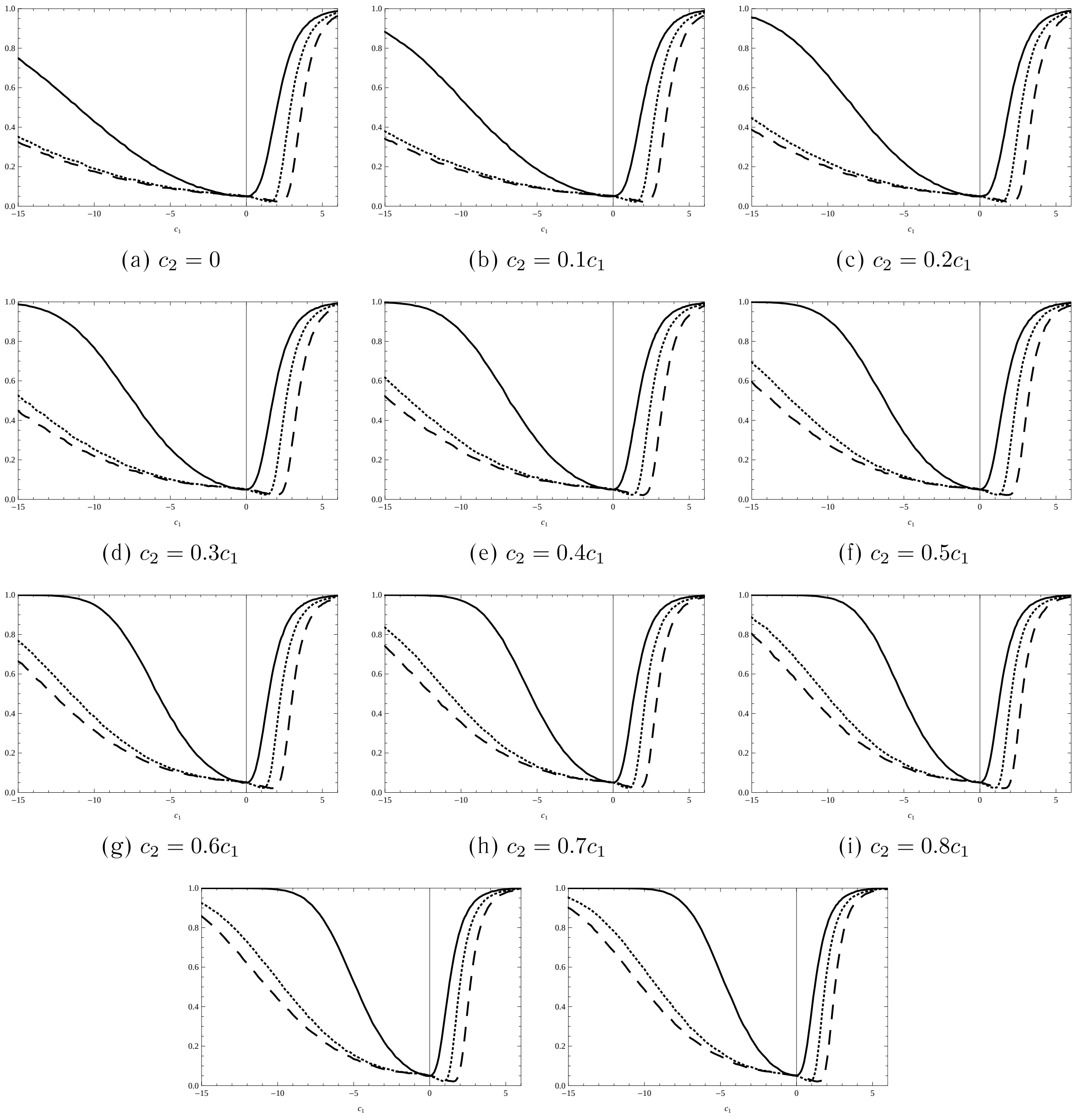
c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
							$\theta_1 = -0.8, \theta_2 = 0$							
5	0.895	0.959	0.861	0.865	0.917	0.975	0.001	0.011	0.001	0.002	0.311	0.615	0.984	0.987
3	0.378	0.557	0.922	0.923	0.900	0.918	0.002	0.002	0.002	0.002	0.002	0.002	0.742	0.817
2	0.035	0.040	0.725	0.724	0.724	0.754	0.004	0.005	0.005	0.006	0.005	0.004	0.374	0.606
1	0.029	0.029	0.134	0.126	0.182	0.182	0.016	0.014	0.015	0.017	0.015	0.017	0.202	0.293
-5	0.370	0.379	0.434	0.451	0.442	0.425	0.255	0.239	0.209	0.215	0.196	0.169	0.117	0.101
-10	0.783	0.816	0.848	0.862	0.868	0.860	0.652	0.663	0.496	0.504	0.517	0.458	0.302	0.276
-15	0.916	0.970	0.976	0.980	0.982	0.981	0.862	0.913	0.743	0.754	0.790	0.781	0.571	0.539
-20	0.933	0.988	0.996	0.997	0.998	0.998	0.896	0.976	0.887	0.894	0.879	0.943	0.778	0.750
-30	0.973	0.997	1.000	1.000	1.000	1.000	0.952	0.993	0.985	0.986	0.932	0.985	0.966	0.960
-40	0.987	1.000	1.000	1.000	1.000	1.000	0.974	0.998	0.998	0.998	0.961	0.995	0.995	0.993
							$\theta_1 = -0.5, \theta_2 = 0$							
5	0.941	0.982	0.689	0.704	0.855	0.944	0.026	0.044	0.004	0.005	0.967	0.960	0.973	0.974
3	0.902	0.872	0.880	0.881	0.775	0.833	0.094	0.184	0.002	0.004	0.447	0.323	0.615	0.641
2	0.691	0.574	0.714	0.713	0.605	0.656	0.052	0.083	0.005	0.006	0.039	0.041	0.163	0.271
1	0.166	0.069	0.206	0.178	0.202	0.178	0.018	0.016	0.017	0.018	0.029	0.023	0.113	0.219
-5	0.365	0.329	0.484	0.500	0.453	0.421	0.240	0.272	0.197	0.203	0.198	0.209	0.110	0.081
-10	0.874	0.765	0.833	0.838	0.804	0.779	0.672	0.702	0.447	0.456	0.551	0.590	0.276	0.222
-15	0.991	0.962	0.939	0.942	0.928	0.917	0.941	0.933	0.623	0.633	0.871	0.850	0.426	0.371
-20	0.999	0.998	0.982	0.984	0.978	0.974	0.991	0.994	0.755	0.765	0.974	0.965	0.584	0.529
-30	1.000	1.000	0.998	0.997	0.997	0.996	1.000	1.000	0.918	0.926	0.999	0.999	0.828	0.787
-40	1.000	1.000	0.999	0.999	0.999	0.999	1.000	1.000	0.971	0.974	1.000	1.000	0.941	0.922
							$\theta_1 = 0.5, \theta_2 = 0$							
5	0.888	0.959	0.570	0.606	0.818	0.922	0.007	0.010	0.000	0.000	0.965	0.884	0.955	0.819
3	0.920	0.922	0.707	0.721	0.760	0.834	0.011	0.014	0.003	0.003	0.546	0.572	0.589	0.594
2	0.742	0.746	0.564	0.587	0.575	0.635	0.009	0.010	0.004	0.004	0.059	0.064	0.091	0.095
1	0.277	0.273	0.242	0.267	0.210	0.234	0.016	0.020	0.015	0.016	0.028	0.030	0.038	0.046
-5	0.364	0.394	0.461	0.480	0.445	0.454	0.130	0.143	0.175	0.179	0.138	0.139	0.127	0.120
-10	0.866	0.891	0.892	0.933	0.872	0.886	0.403	0.448	0.454	0.475	0.376	0.389	0.326	0.321
-15	0.987	0.990	0.963	0.980	0.941	0.946	0.736	0.788	0.669	0.697	0.691	0.722	0.523	0.526
-20	0.999	1.000	0.982	0.989	0.968	0.968	0.925	0.953	0.746	0.764	0.895	0.919	0.631	0.627
-30	1.000	1.000	0.993	0.996	0.991	0.991	0.995	0.999	0.855	0.856	0.992	0.998	0.753	0.735
-40	1.000	1.000	0.999	0.999	0.998	0.998	1.000	1.000	0.925	0.927	0.999	1.000	0.855	0.844
							$\theta_1 = 0.8, \theta_2 = 0$							
5	0.755	0.853	0.612	0.636	0.779	0.885	0.003	0.005	0.000	0.000	0.962	0.946	0.963	0.896
3	0.861	0.905	0.715	0.733	0.714	0.813	0.006	0.008	0.002	0.002	0.547	0.545	0.607	0.607
2	0.654	0.704	0.542	0.566	0.526	0.612	0.009	0.012	0.007	0.008	0.067	0.068	0.106	0.119
1	0.217	0.242	0.187	0.206	0.165	0.197	0.018	0.016	0.017	0.017	0.028	0.025	0.039	0.055
-5	0.294	0.312	0.415	0.455	0.393	0.434	0.121	0.127	0.169	0.185	0.127	0.123	0.118	0.114
-10	0.748	0.779	0.838	0.890	0.799	0.845	0.311	0.346	0.397	0.445	0.308	0.324	0.279	0.290
-15	0.956	0.970	0.954	0.974	0.934	0.947	0.587	0.636	0.618	0.665	0.551	0.576	0.465	0.477
-20	0.990	0.996	0.977	0.987	0.967	0.971	0.798	0.857	0.723	0.754	0.768	0.810	0.584	0.593
-30	0.999	1.000	0.995	0.996	0.991	0.992	0.960	0.988	0.853	0.864	0.949	0.979	0.756	0.747
-40	1.000	1.000	0.999	0.999	0.998	0.998	0.992	0.999	0.926	0.934	0.989	0.998	0.853	0.845

Table 28. Finite sample size-adjusted power, AR(2) errors, $c_2 = c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
							$\varphi_1 = \varphi_2 = -0.8$							
5	0.926	0.976	0.728	0.736	0.866	0.954	0.023	0.036	0.002	0.002	0.971	0.976	0.963	0.966
3	0.938	0.940	0.892	0.899	0.804	0.866	0.076	0.137	0.004	0.002	0.561	0.609	0.553	0.574
2	0.792	0.798	0.684	0.714	0.639	0.692	0.093	0.177	0.006	0.005	0.050	0.057	0.050	0.071
1	0.367	0.371	0.312	0.294	0.289	0.314	0.027	0.034	0.017	0.017	0.022	0.022	0.018	0.023
-5	0.458	0.489	0.493	0.514	0.470	0.483	0.155	0.174	0.127	0.128	0.126	0.128	0.069	0.062
-10	0.967	0.981	0.850	0.858	0.822	0.827	0.530	0.589	0.320	0.321	0.420	0.439	0.177	0.167
-15	0.999	1.000	0.946	0.951	0.944	0.945	0.911	0.948	0.500	0.504	0.832	0.859	0.324	0.307
-20	1.000	1.000	0.979	0.981	0.977	0.978	0.991	0.998	0.626	0.629	0.978	0.990	0.463	0.449
-30	1.000	1.000	0.997	0.997	0.998	0.998	1.000	1.000	0.816	0.821	0.999	1.000	0.719	0.708
-40	1.000	1.000	0.999	0.999	1.000	1.000	0.999	1.000	0.916	0.922	0.999	1.000	0.886	0.880
							$\varphi_1 = \varphi_2 = -0.5$							
5	0.919	0.972	0.681	0.696	0.864	0.945	0.018	0.030	0.003	0.003	0.973	0.975	0.971	0.976
3	0.925	0.923	0.845	0.852	0.786	0.852	0.069	0.130	0.003	0.005	0.546	0.570	0.593	0.615
2	0.774	0.770	0.692	0.702	0.629	0.684	0.077	0.146	0.007	0.007	0.053	0.054	0.099	0.157
1	0.314	0.299	0.298	0.257	0.279	0.268	0.022	0.023	0.018	0.019	0.020	0.016	0.041	0.111
-5	0.358	0.316	0.554	0.586	0.535	0.548	0.146	0.153	0.195	0.213	0.131	0.109	0.154	0.141
-10	0.936	0.928	0.915	0.923	0.890	0.890	0.500	0.535	0.476	0.506	0.428	0.380	0.359	0.327
-15	0.998	0.998	0.960	0.964	0.950	0.948	0.878	0.904	0.628	0.648	0.821	0.791	0.503	0.472
-20	1.000	1.000	0.984	0.986	0.981	0.980	0.985	0.994	0.714	0.739	0.974	0.978	0.605	0.583
-30	1.000	1.000	0.997	0.997	0.997	0.997	0.999	1.000	0.872	0.890	0.998	1.000	0.800	0.786
-40	1.000	1.000	0.999	0.999	0.999	0.999	1.000	1.000	0.939	0.951	1.000	1.000	0.910	0.900
							$\varphi_1 = \varphi_2 = 0.5$							
5	0.870	0.920	0.506	0.512	0.801	0.905	0.007	0.007	0.001	0.001	0.921	0.699	0.870	0.617
3	0.920	0.922	0.619	0.623	0.740	0.812	0.008	0.010	0.003	0.003	0.514	0.534	0.566	0.561
2	0.727	0.729	0.484	0.484	0.547	0.600	0.007	0.008	0.008	0.008	0.054	0.048	0.083	0.079
1	0.260	0.247	0.229	0.228	0.213	0.218	0.017	0.022	0.021	0.021	0.017	0.015	0.026	0.024
-5	0.301	0.270	0.461	0.426	0.430	0.400	0.127	0.150	0.208	0.212	0.105	0.099	0.128	0.111
-10	0.830	0.817	0.878	0.865	0.863	0.852	0.383	0.422	0.482	0.497	0.296	0.274	0.310	0.283
-15	0.983	0.979	0.959	0.978	0.941	0.940	0.733	0.770	0.699	0.718	0.614	0.582	0.502	0.483
-20	0.999	0.999	0.981	0.989	0.964	0.962	0.921	0.937	0.778	0.807	0.857	0.832	0.624	0.613
-30	1.000	1.000	0.993	0.993	0.987	0.983	0.995	0.999	0.855	0.855	0.990	0.991	0.712	0.688
-40	1.000	1.000	0.998	0.998	0.996	0.995	1.000	1.000	0.909	0.907	0.999	1.000	0.789	0.766
							$\varphi_1 = \varphi_2 = 0.8$							
5	0.491	0.511	0.336	0.340	0.441	0.362	0.006	0.003	0.001	0.000	0.328	0.132	0.203	0.095
3	0.633	0.662	0.343	0.346	0.447	0.361	0.002	0.002	0.001	0.001	0.303	0.293	0.324	0.235
2	0.442	0.468	0.260	0.262	0.283	0.199	0.005	0.005	0.005	0.004	0.060	0.065	0.068	0.046
1	0.134	0.140	0.098	0.100	0.072	0.040	0.015	0.014	0.013	0.008	0.017	0.019	0.017	0.008
-5	0.240	0.256	0.319	0.328	0.199	0.104	0.119	0.128	0.120	0.093	0.075	0.075	0.065	0.030
-10	0.636	0.676	0.712	0.719	0.551	0.356	0.269	0.289	0.255	0.208	0.180	0.184	0.138	0.076
-15	0.898	0.919	0.908	0.903	0.797	0.635	0.488	0.521	0.440	0.377	0.321	0.334	0.247	0.153
-20	0.969	0.981	0.940	0.943	0.871	0.753	0.710	0.752	0.578	0.515	0.514	0.541	0.358	0.236
-30	0.998	0.999	0.972	0.982	0.915	0.840	0.928	0.950	0.696	0.645	0.822	0.851	0.498	0.366
-40	1.000	1.000	0.982	0.987	0.932	0.860	0.985	0.991	0.735	0.699	0.950	0.958	0.550	0.439

Table 29. Finite sample size-adjusted power, AR(2) errors, $c_2 = c_1$

c_1	F^{GLS}						F_d^{OLS}				F_i^{OLS}			
	AIC	*BIC*	*MAIC*	*MBIC*	*MAIC-PQ*	*MBIC-PQ*	*AIC*	*BIC*	*MAIC*	*MBIC*	*AIC*	*BIC*	*MAIC*	*MBIC*
$\varphi_1 = -0.8, \varphi_2 = 0$														
5	0.892	0.959	0.902	0.904	0.838	0.946	0.017	0.025	0.002	0.003	0.972	0.976	0.970	0.972
3	0.945	0.948	0.897	0.900	0.794	0.859	0.060	0.105	0.001	0.002	0.596	0.638	0.637	0.670
2	0.798	0.805	0.695	0.709	0.604	0.667	0.074	0.143	0.006	0.007	0.092	0.094	0.147	0.216
1	0.377	0.387	0.278	0.247	0.246	0.270	0.027	0.031	0.019	0.020	0.034	0.030	0.067	0.132
-5	0.419	0.454	0.341	0.342	0.301	0.304	0.154	0.171	0.146	0.152	0.157	0.162	0.162	0.159
-10	0.953	0.970	0.747	0.747	0.715	0.720	0.510	0.570	0.327	0.337	0.453	0.470	0.402	0.398
-15	0.998	0.999	0.923	0.924	0.919	0.921	0.899	0.939	0.523	0.534	0.852	0.869	0.672	0.669
-20	1.000	1.000	0.976	0.976	0.974	0.975	0.988	0.997	0.672	0.685	0.983	0.992	0.841	0.839
-30	1.000	1.000	0.996	0.996	0.996	0.996	0.999	1.000	0.881	0.886	1.000	1.000	0.960	0.959
-40	1.000	1.000	0.998	0.998	0.997	0.997	1.000	1.000	0.956	0.960	1.000	1.000	0.990	0.990
$\varphi_1 = -0.5, \varphi_2 = 0$														
5	0.923	0.977	0.740	0.755	0.837	0.944	0.020	0.033	0.002	0.002	0.974	0.979	0.972	0.975
3	0.935	0.933	0.884	0.893	0.766	0.848	0.074	0.146	0.005	0.003	0.577	0.630	0.601	0.620
2	0.789	0.791	0.693	0.721	0.602	0.669	0.073	0.165	0.006	0.005	0.071	0.098	0.097	0.122
1	0.346	0.337	0.253	0.254	0.226	0.254	0.021	0.025	0.013	0.013	0.033	0.056	0.051	0.076
-5	0.484	0.557	0.381	0.417	0.356	0.368	0.175	0.225	0.136	0.156	0.185	0.219	0.112	0.103
-10	0.955	0.970	0.779	0.799	0.746	0.752	0.560	0.681	0.340	0.373	0.519	0.611	0.264	0.255
-15	0.999	1.000	0.912	0.926	0.909	0.912	0.897	0.945	0.508	0.551	0.860	0.908	0.412	0.403
-20	1.000	1.000	0.972	0.978	0.973	0.975	0.986	0.995	0.660	0.696	0.976	0.990	0.603	0.595
-30	1.000	1.000	0.996	0.997	0.996	0.996	1.000	1.000	0.858	0.884	1.000	1.000	0.855	0.853
-40	1.000	1.000	0.999	0.999	0.998	0.998	1.000	1.000	0.940	0.955	1.000	1.000	0.953	0.952
$\varphi_1 = 0.5, \varphi_2 = 0$														
5	0.699	0.695	0.444	0.470	0.676	0.707	0.001	0.000	0.001	0.001	0.507	0.201	0.546	0.376
3	0.844	0.819	0.576	0.594	0.679	0.739	0.001	0.001	0.002	0.002	0.454	0.406	0.512	0.490
2	0.641	0.614	0.390	0.421	0.473	0.507	0.005	0.004	0.004	0.004	0.089	0.102	0.134	0.165
1	0.217	0.208	0.118	0.132	0.153	0.147	0.016	0.013	0.011	0.011	0.037	0.050	0.052	0.082
-5	0.402	0.479	0.384	0.414	0.410	0.440	0.143	0.154	0.145	0.148	0.151	0.164	0.119	0.119
-10	0.839	0.886	0.800	0.820	0.807	0.824	0.376	0.424	0.342	0.347	0.346	0.388	0.264	0.257
-15	0.971	0.982	0.922	0.930	0.918	0.921	0.652	0.706	0.549	0.552	0.589	0.643	0.427	0.419
-20	0.997	0.999	0.953	0.960	0.948	0.948	0.838	0.882	0.663	0.659	0.786	0.832	0.547	0.534
-30	1.000	1.000	0.979	0.986	0.976	0.976	0.979	0.988	0.762	0.758	0.962	0.975	0.659	0.643
-40	1.000	1.000	0.993	0.995	0.992	0.993	0.997	0.999	0.823	0.820	0.994	0.997	0.731	0.722
$\varphi_1 = 0.8, \varphi_2 = 0$														
5	0.280	0.298	0.322	0.325	0.312	0.318	0.021	0.015	0.010	0.010	0.228	0.242	0.284	0.280
3	0.288	0.304	0.150	0.162	0.283	0.310	0.002	0.002	0.002	0.003	0.124	0.119	0.159	0.153
2	0.217	0.232	0.117	0.137	0.208	0.233	0.005	0.006	0.007	0.007	0.065	0.069	0.084	0.090
1	0.095	0.102	0.061	0.066	0.096	0.113	0.018	0.018	0.018	0.022	0.032	0.035	0.043	0.054
-5	0.215	0.231	0.227	0.227	0.266	0.292	0.115	0.122	0.132	0.146	0.109	0.108	0.110	0.128
-10	0.459	0.499	0.474	0.478	0.499	0.509	0.180	0.190	0.193	0.199	0.154	0.154	0.132	0.139
-15	0.693	0.735	0.685	0.690	0.695	0.703	0.307	0.330	0.311	0.313	0.247	0.251	0.211	0.210
-20	0.815	0.854	0.792	0.796	0.801	0.804	0.397	0.442	0.387	0.388	0.309	0.329	0.267	0.266
-30	0.947	0.964	0.884	0.885	0.877	0.880	0.595	0.657	0.517	0.519	0.488	0.533	0.372	0.368
-40	0.980	0.991	0.918	0.920	0.910	0.910	0.742	0.810	0.602	0.606	0.634	0.705	0.449	0.447



(a) $c_2 = 0$ (b) $c_2 = 0.1c_1$ (c) $c_2 = 0.2c_1$

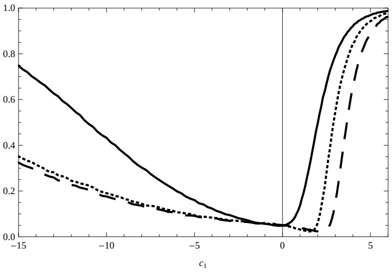
(d) $c_2 = 0.3c_1$ (e) $c_2 = 0.4c_1$ (f) $c_2 = 0.5c_1$

(g) $c_2 = 0.6c_1$ (h) $c_2 = 0.7c_1$ (i) $c_2 = 0.8c_1$

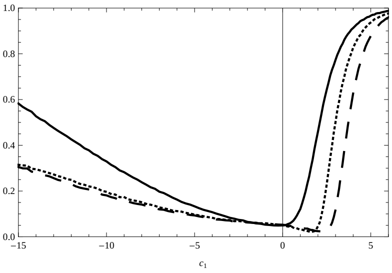
(j) $c_2 = 0.9c_1$ (k) $c_2 = c_1$

Figure 1. Asymptotic local power, $\gamma > 0$

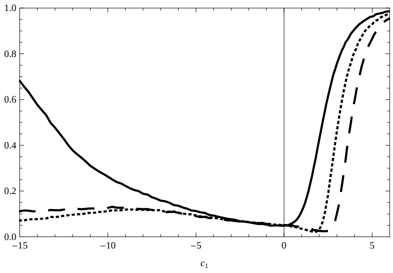
$$F^{GLS} : \text{——} \, , F_i^{OLS} : \text{— —} \, , F_d^{OLS} : \cdot \cdot \cdot$$



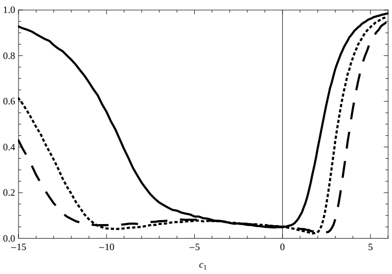
(a) $c_2 = 0$



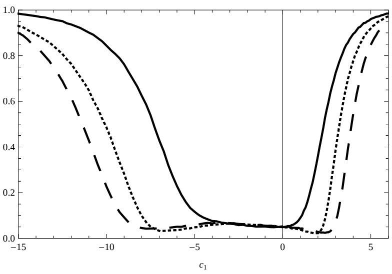
(b) $c_2 = -0.1c_1$



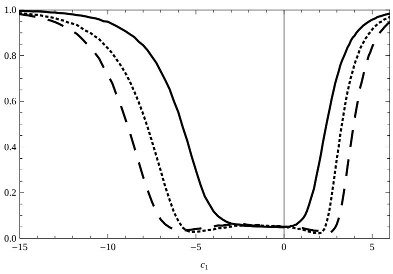
(c) $c_2 = -0.2c_1$



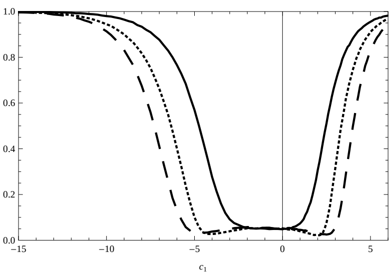
(d) $c_2 = -0.3c_1$



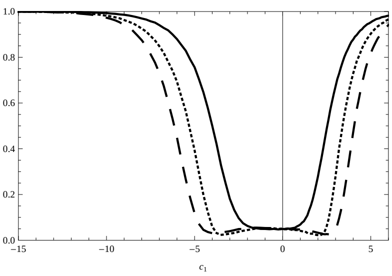
(e) $c_2 = -0.4c_1$



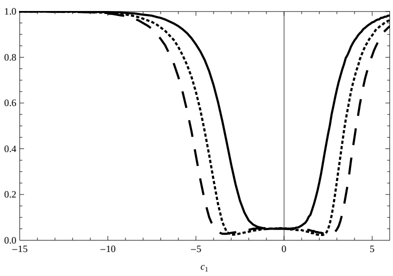
(f) $c_2 = -0.5c_1$



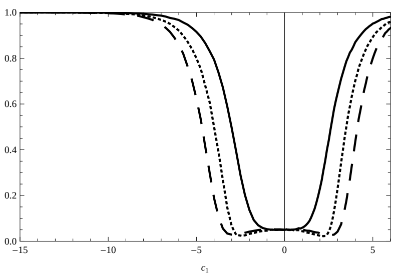
(g) $c_2 = -0.6c_1$



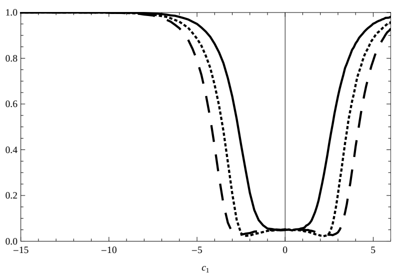
(h) $c_2 = -0.7c_1$



(i) $c_2 = -0.8c_1$



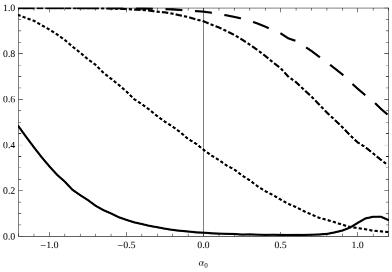
(j) $c_2 = -0.9c_1$



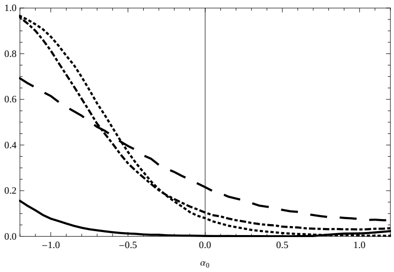
(k) $c_2 = -c_1$

Figure 2. Asymptotic local power, $\gamma < 0$

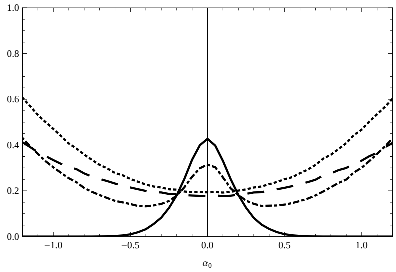
F^{GLS} : —— , F_i^{OLS} : — — , F_d^{OLS} : · · · ·



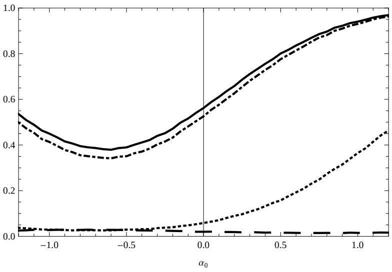
(a) $c_1 = c_2 = -5$



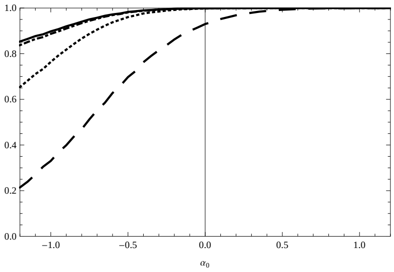
(b) $c_1 = -5, c_2 = -2.5$



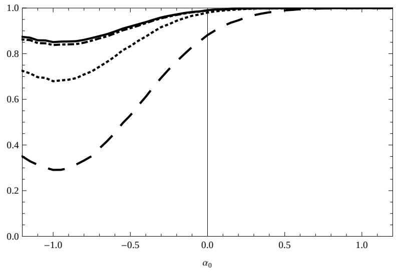
(c) $c_1 = -10, c_2 = 0$



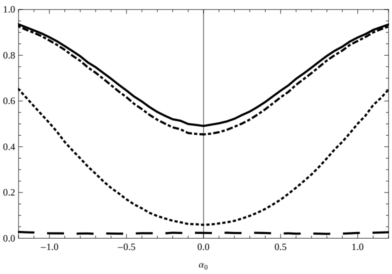
(d) $c_1 = 1, c_2 = 1$



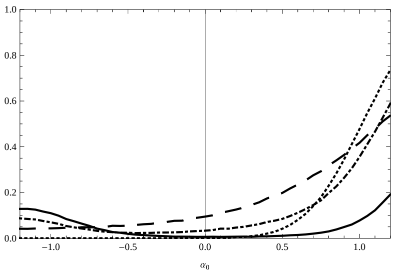
(e) $c_1 = 2, c_2 = 2$



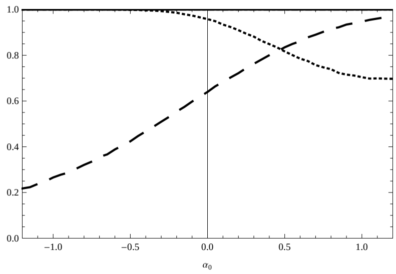
(f) $c_1 = 1, c_2 = 3$



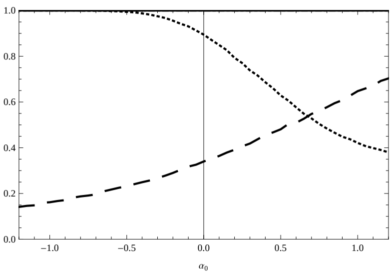
(g) $c_1 = 2, c_2 = 0$



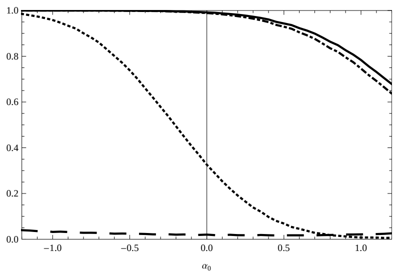
(h) $c_1 = -10, c_2 = 1$



(i) $c_1 = -10, c_2 = 2$



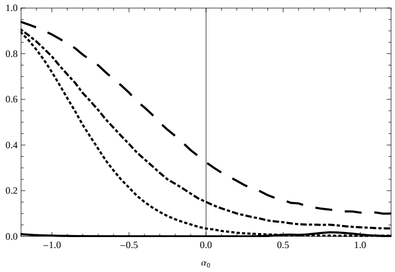
(j) $c_1 = -8, c_2 = 2$



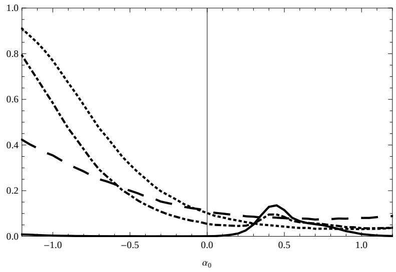
(k) $c_1 = -2, c_2 = 2$

Figure 3. Asymptotic local power, $\alpha_{-1} = -1$

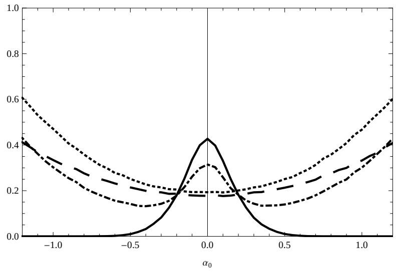
F^{GLS} : ——— , F_i^{OLS} : — — , F_d^{OLS} : · · · · , UR : —·—



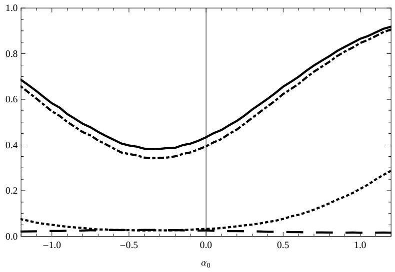
(a) $c_1 = c_2 = -5$



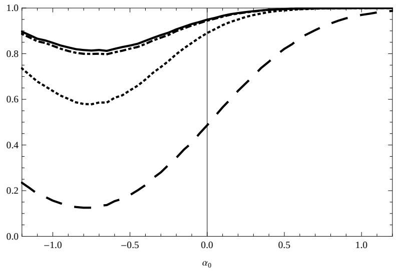
(b) $c_1 = -5, c_2 = -2.5$



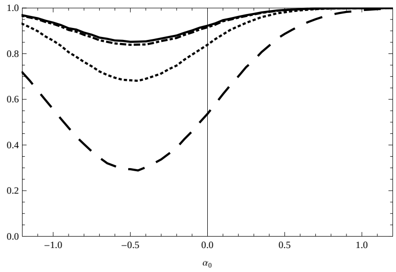
(c) $c_1 = -10, c_2 = 0$



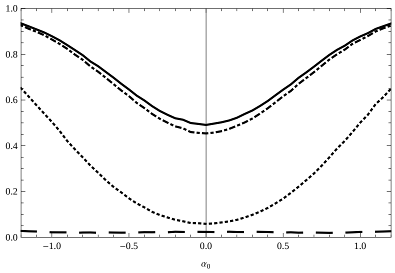
(d) $c_1 = 1, c_2 = 1$



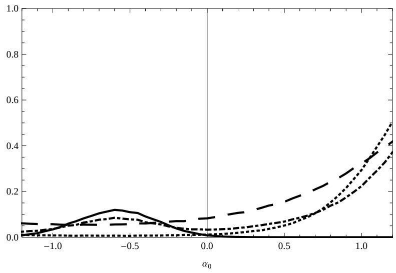
(e) $c_1 = 2, c_2 = 2$



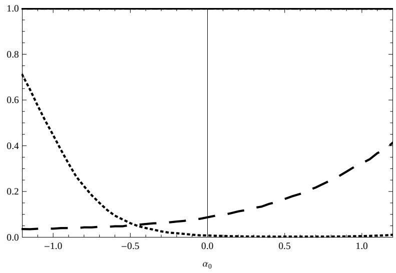
(f) $c_1 = 1, c_2 = 3$



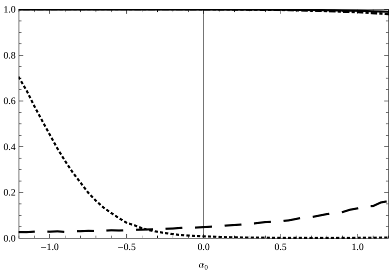
(g) $c_1 = 2, c_2 = 0$



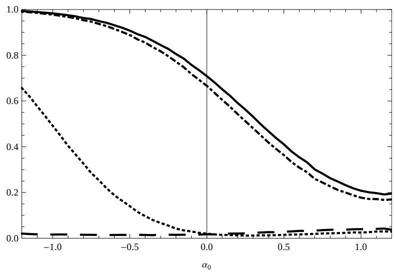
(h) $c_1 = -10, c_2 = 1$



(i) $c_1 = -10, c_2 = 2$



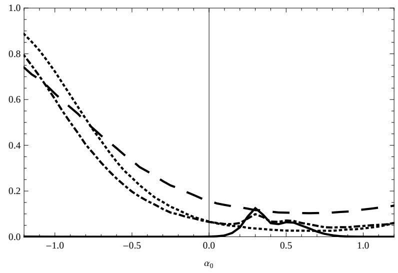
(j) $c_1 = -8, c_2 = 2$



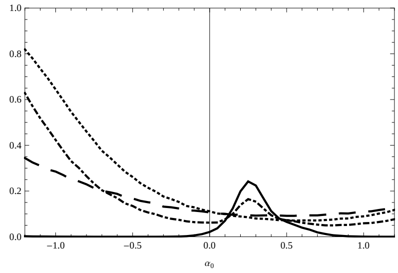
(k) $c_1 = -2, c_2 = 2$

Figure 4. Asymptotic local power, $\alpha_{-1} = -0.5$

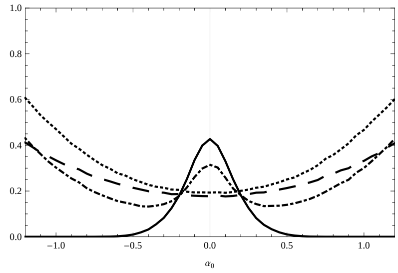
F^{GLS} : ——, F_i^{OLS} : — —, F_d^{OLS} : · · · , UR : —·—



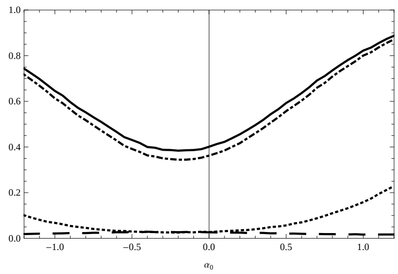
(a) $c_1 = c_2 = -5$



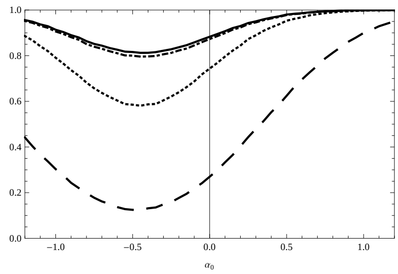
(b) $c_1 = -5, c_2 = -2.5$



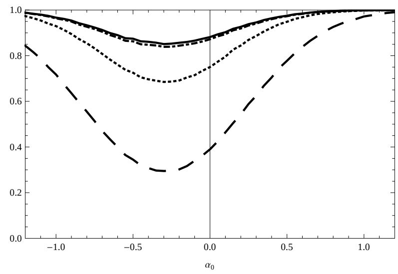
(c) $c_1 = -10, c_2 = 0$



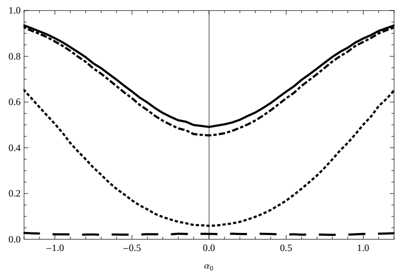
(d) $c_1 = 1, c_2 = 1$



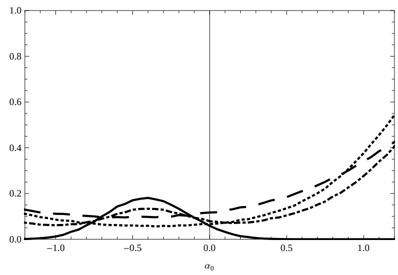
(e) $c_1 = 2, c_2 = 2$



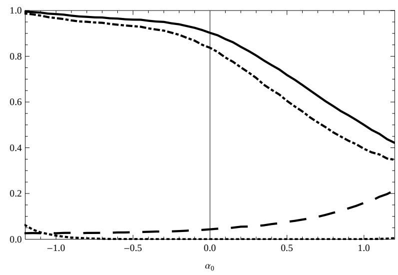
(f) $c_1 = 1, c_2 = 3$



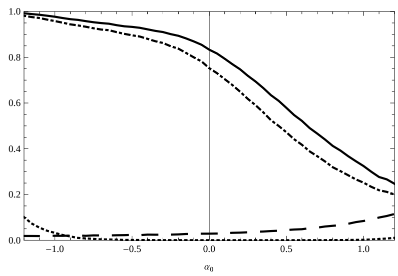
(g) $c_1 = 2, c_2 = 0$



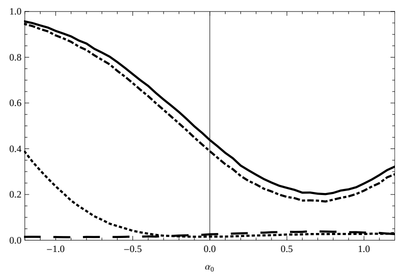
(h) $c_1 = -10, c_2 = 1$



(i) $c_1 = -10, c_2 = 2$



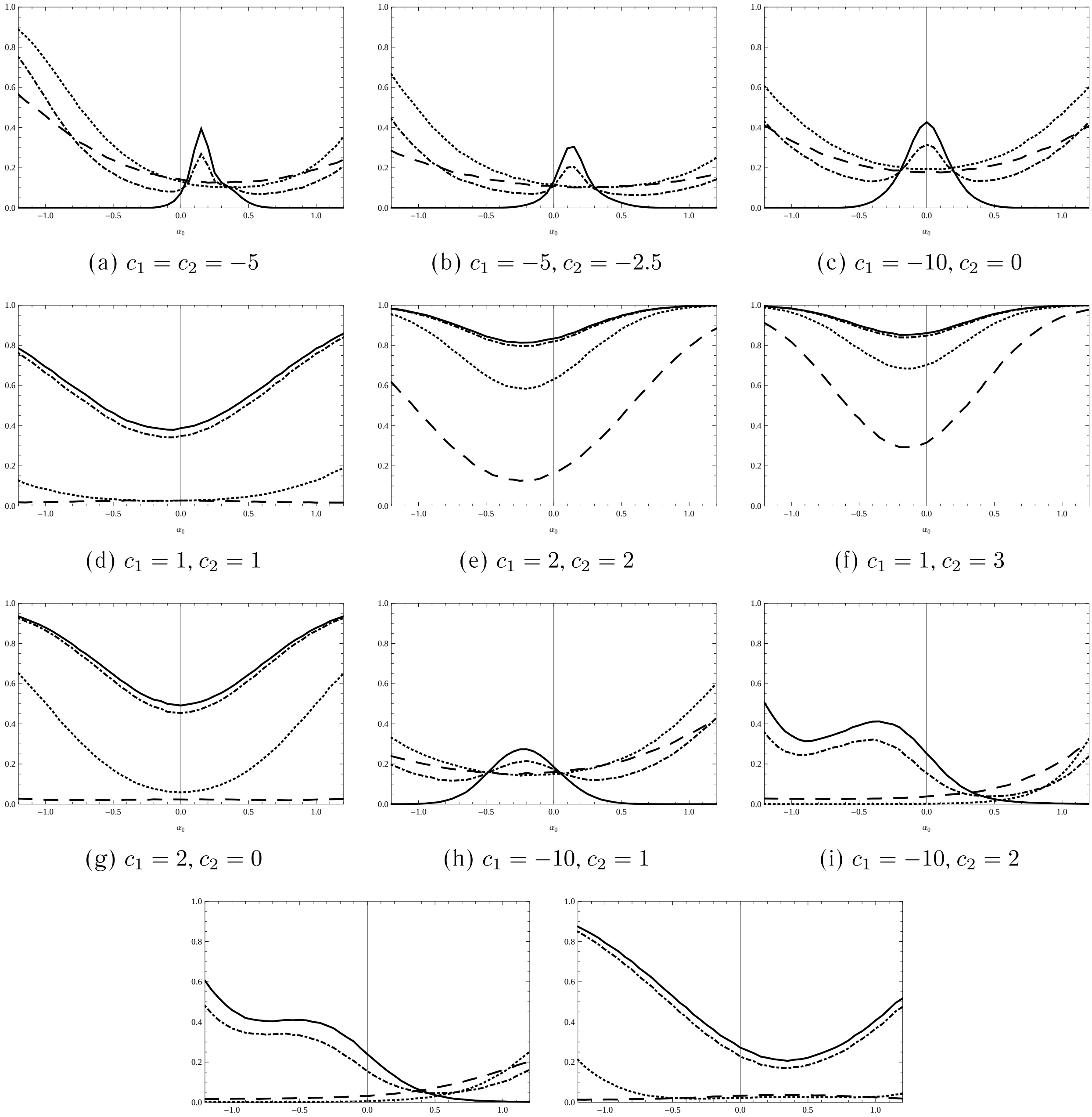
(j) $c_1 = -8, c_2 = 2$



(k) $c_1 = -2, c_2 = 2$

Figure 5. Asymptotic local power, $\alpha_{-1} = -0.3$

F^{GLS} : ——, F_i^{OLS} : — —, F_d^{OLS} : · · · , UR : —·—



(a) $c_1 = c_2 = -5$ (b) $c_1 = -5, c_2 = -2.5$ (c) $c_1 = -10, c_2 = 0$

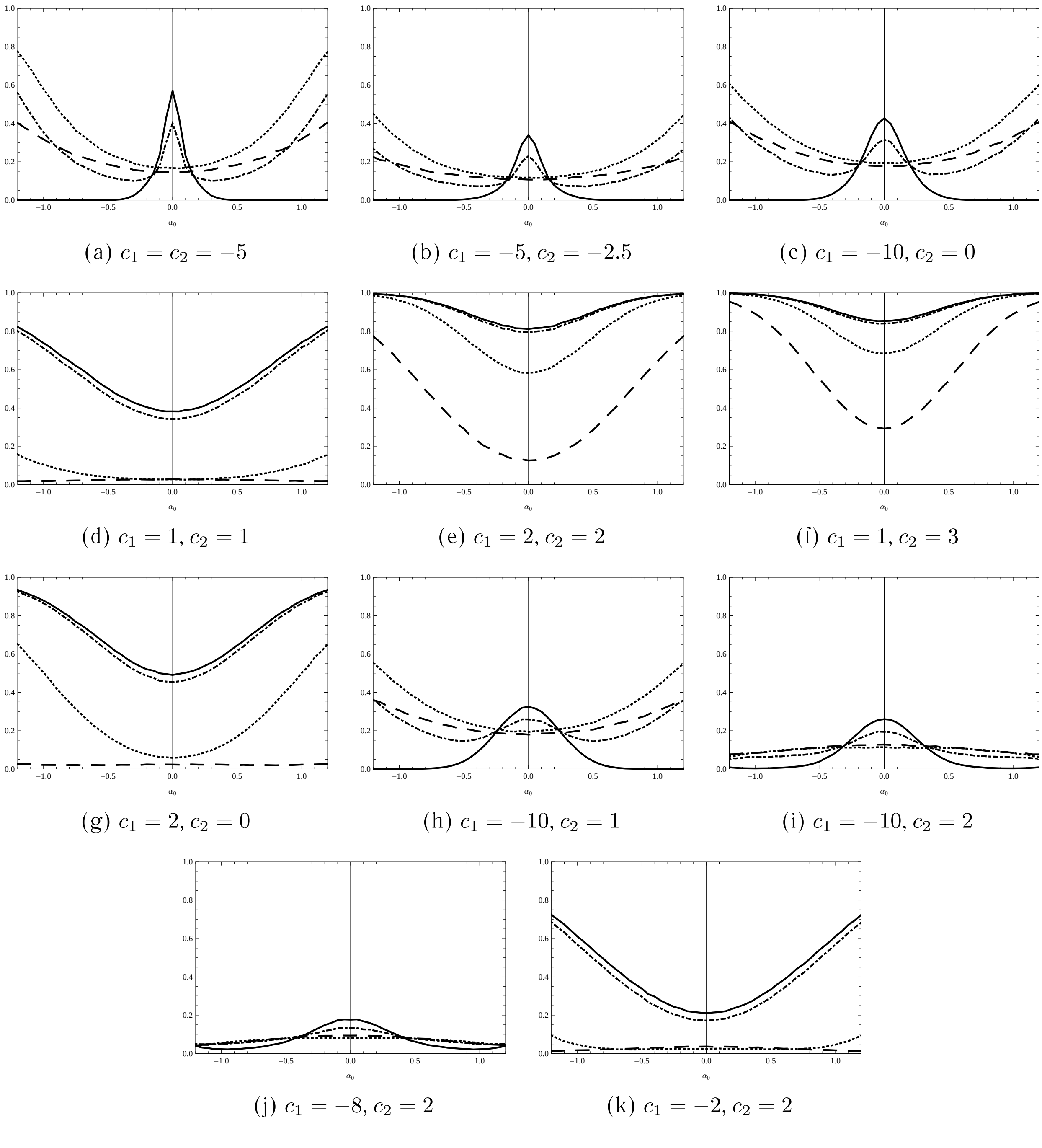
(d) $c_1 = 1, c_2 = 1$ (e) $c_1 = 2, c_2 = 2$ (f) $c_1 = 1, c_2 = 3$

(g) $c_1 = 2, c_2 = 0$ (h) $c_1 = -10, c_2 = 1$ (i) $c_1 = -10, c_2 = 2$

(j) $c_1 = -8, c_2 = 2$ (k) $c_1 = -2, c_2 = 2$

Figure 6. Asymptotic local power, $\alpha_{-1} = -0.15$

F^{GLS} : ——, F_i^{OLS} : — —, F_d^{OLS} : · · · ·, UR : —·—



(a) $c_1 = c_2 = -5$ (b) $c_1 = -5, c_2 = -2.5$ (c) $c_1 = -10, c_2 = 0$

(d) $c_1 = 1, c_2 = 1$ (e) $c_1 = 2, c_2 = 2$ (f) $c_1 = 1, c_2 = 3$

(g) $c_1 = 2, c_2 = 0$ (h) $c_1 = -10, c_2 = 1$ (i) $c_1 = -10, c_2 = 2$

(j) $c_1 = -8, c_2 = 2$ (k) $c_1 = -2, c_2 = 2$

Figure 7. Asymptotic local power, $\alpha_{-1} = 0$

F^{GLS} : ——— , F_i^{OLS} : — — , F_d^{OLS} : · · · · , UR : —·—