The Size-Power Tradeoff in HAR Inference: Supplement

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This supplement provides additional figures and Monte Carlo results.

Figures S.1 plots the implied mean kernel for the Fourier, cosine, and SS basis functions for B = 8 and T = 200. The Fourier transforms of these implied mean kernels, that is, the frequency-domain implied mean kernel, are plotted in Figure S.2 at the frequencies $2\pi j/T$, j = 0, …, 35. The EWP (Fourier) estimator is the only one of these four that has an exact kernel representation, and its frequency-domain kernel is the familiar flat (Daniell) kernel that gives equal weight to the first $B/2$ periodogram ordinates. The remaining three implied mean kernels in the frequency domain also concentrate their mass at low frequencies.

Figure S.3 shows the power difference, as a function of the local alternative index δ, between the EWP and QS test, for B = 8 for EWP and b for QS chosen so that the two tests have the same size. This curve is computed using the expression in Theorem 3 and Remark 6.

Figure S.4 shows additional Monte Carlo results for different values of T for 6 tests: QS, EWP, cosine (type II cosine basis function), NW, and SS.

Figure S.5 shows the spectral density for the ARMA(2,1) process. The parameters are calibrated so that $\omega^{(2)} = 4$ (the same as an AR(1) with $\rho = 0.5$) and with a spectral density approximately symmetric around $\pi/2$, with a minimum at $\pi/2$ (the coefficients are $\rho_1 = 0.048$, $\rho_2 = 0.248$, $\theta = -0.064$).

Figure S.6 shows results for ARMA(2,1) disturbances, m = 1.

Figures S.7 and S.8 show additional results for m = 2.

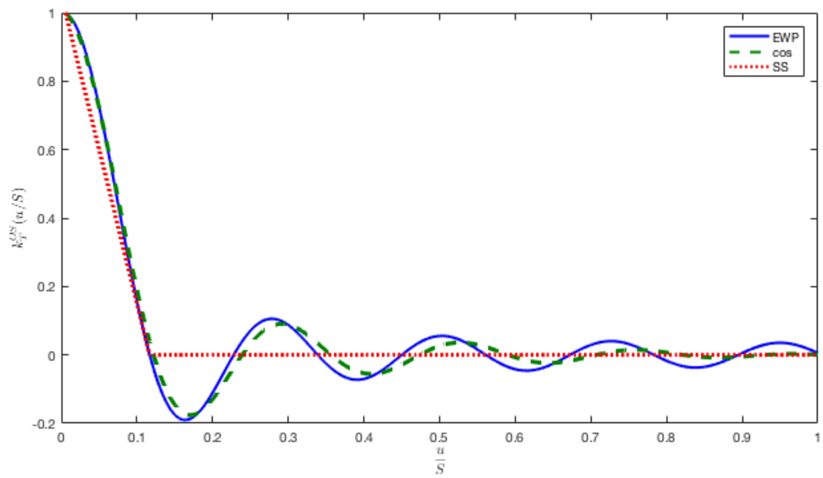

Figure S.1. Implied mean kernel of basis function estimators with B = 8, time domain: Fourier/EWP (blue, solid), cosine (green, dash), and split-sample (red, dot).

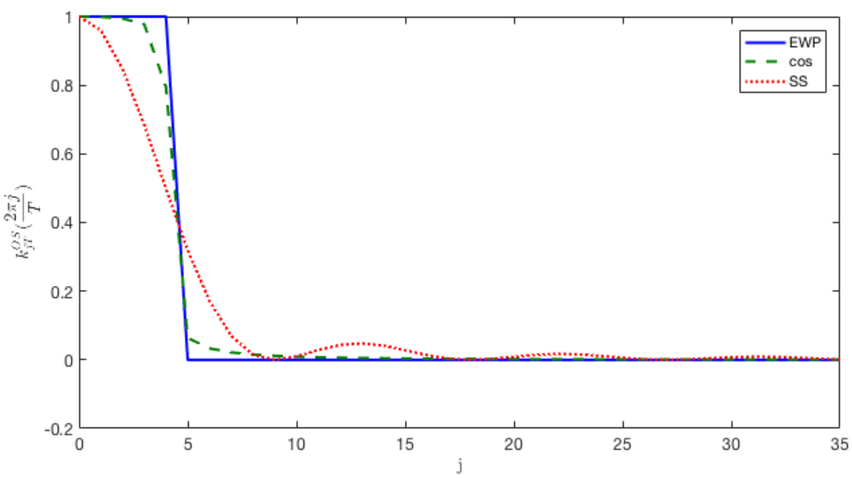

Figure S.2. Implied mean kernel of basis function estimators with B = 8, frequency domain: Fourier/EWP (blue, solid), cosine (green, dash), and split-sample (red, dot). The frequency domain kernel is normalized to 1 at $\omega = 0$ and computed over the periodogram ordinates (so the horizontal axis value j corresponds to $2\pi j/T$, etc.).

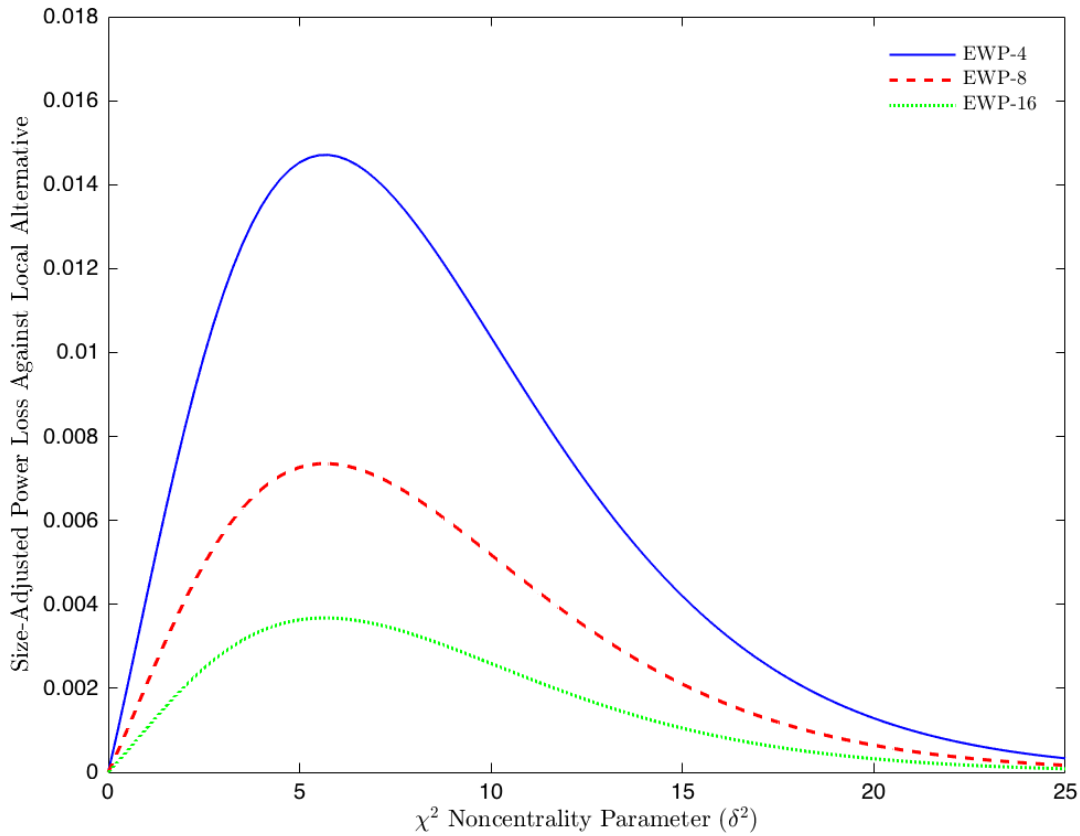

Figure S.3. Small-b approximation to power loss for EWP test, compared to QS test, for different values of B in the EWP test and with b for the QS test chosen so that the EWP and QS tests have the same higher-order size when evaluated using fixed-b critical values. The figure plots the final expression in (44) as a function of δ. Gaussian location model, m=1, 5% significance level.

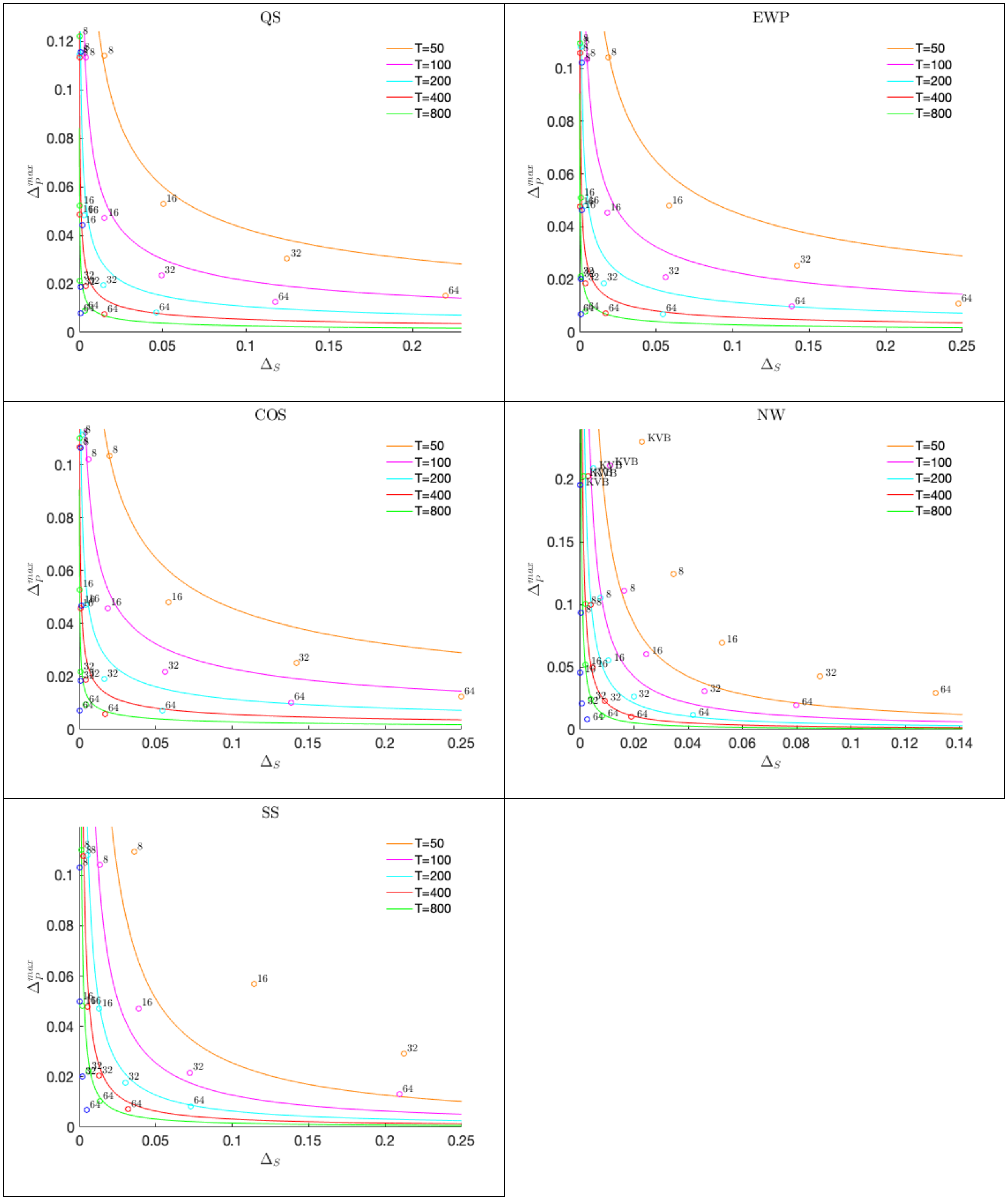

Figure S.4. Location model, AR(1), $m = 1$, $\rho = 0.5$.
Theoretical size distortion/power loss trade-off curves for each estimator with Monte Carlo results for T ranging from 50 to 1600.

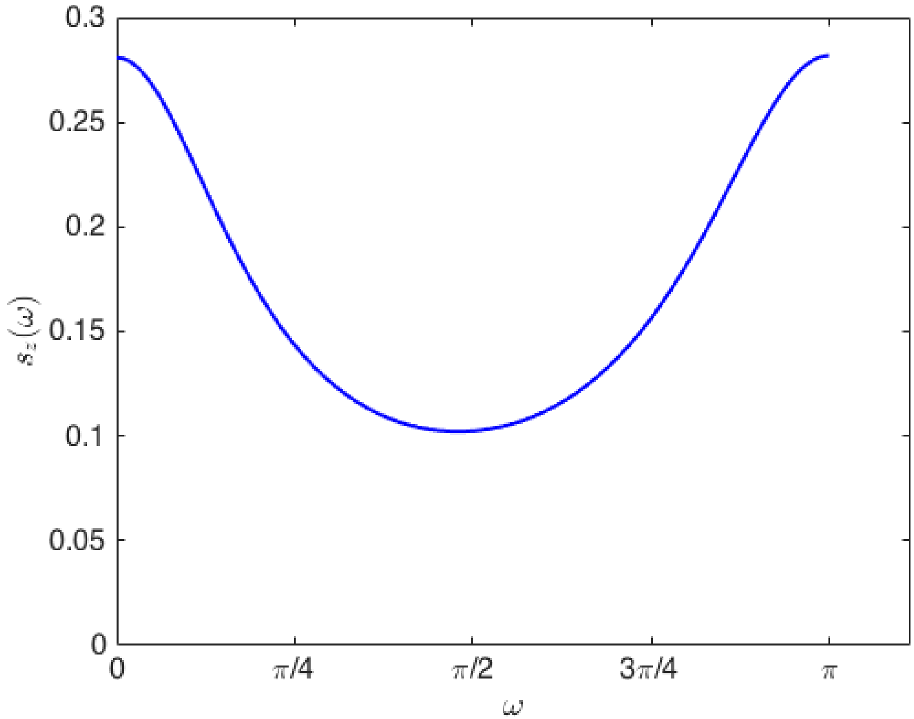

Figure S.5. Spectral density of calibrated ARMA(2,1), $\omega^{(2)} = 4$.

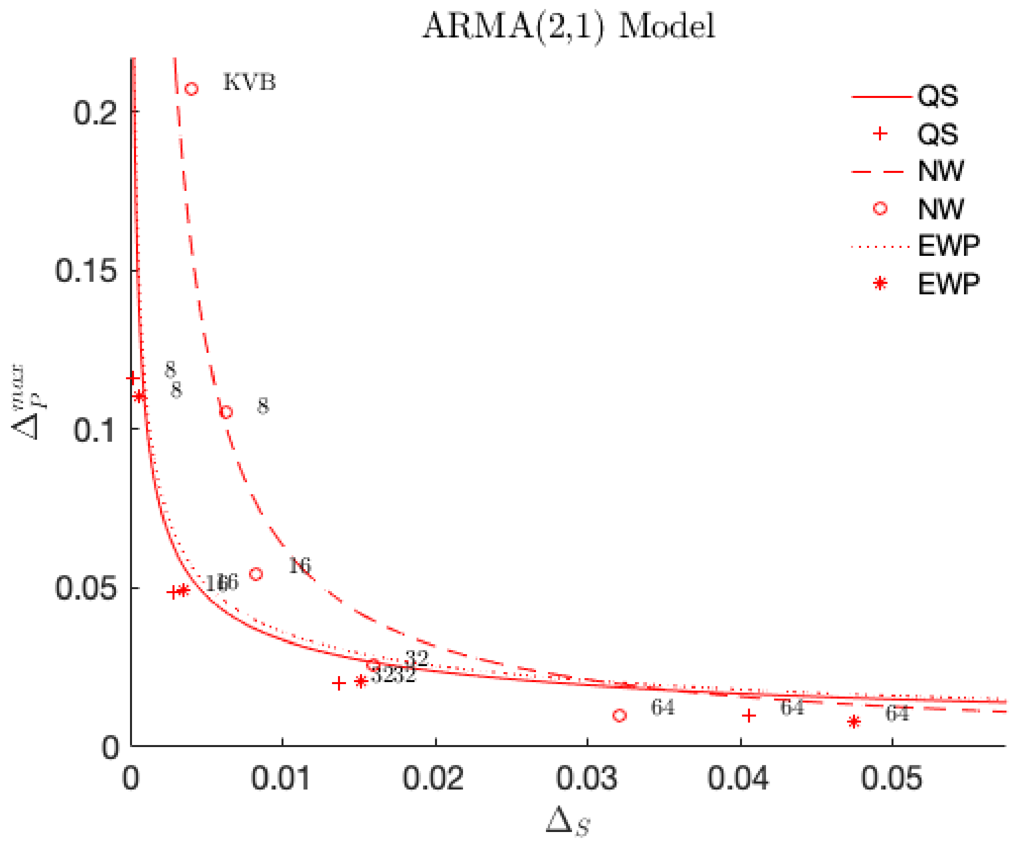

Figure S.6. Location model, ARMA(2,1), $m = 1$, $T = 200$.
Theoretical size distortion/power loss trade-off curves for QS, Newey-West, and EWP estimators with Monte Carlo results. ARMA(2,1) parameters fixed such that $\omega^{(2)} = 4$, equivalent to AR(1) with $\alpha = 0.5$ (parameter values as in Figure S.5).

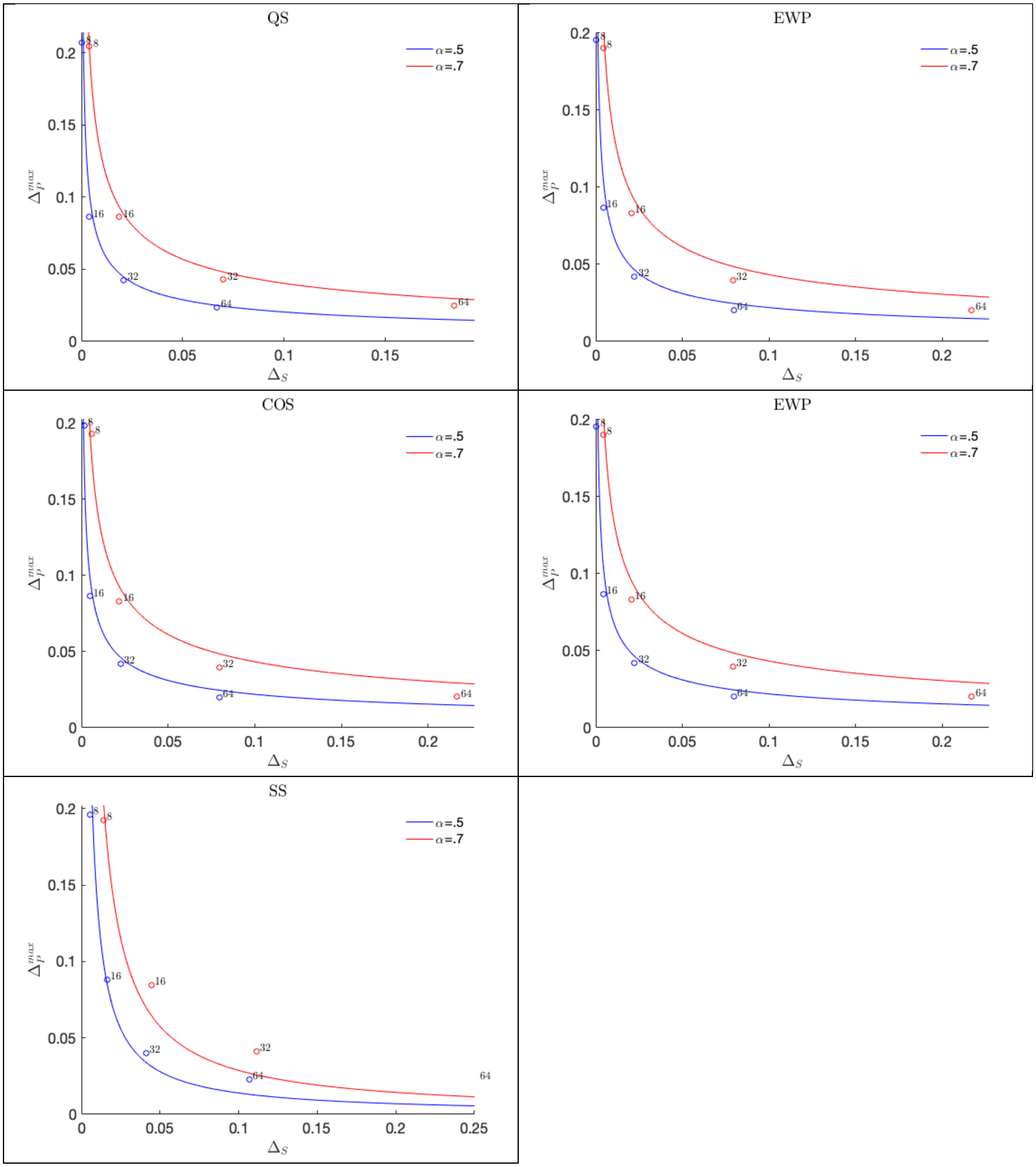

Figure S.7. Location model, AR(1), $m = 2$, $\rho = .5$ and $.7$, $T = 200$.
Theoretical size distortion/power loss trade-off curves for each estimator and Monte Carlo results (dots).

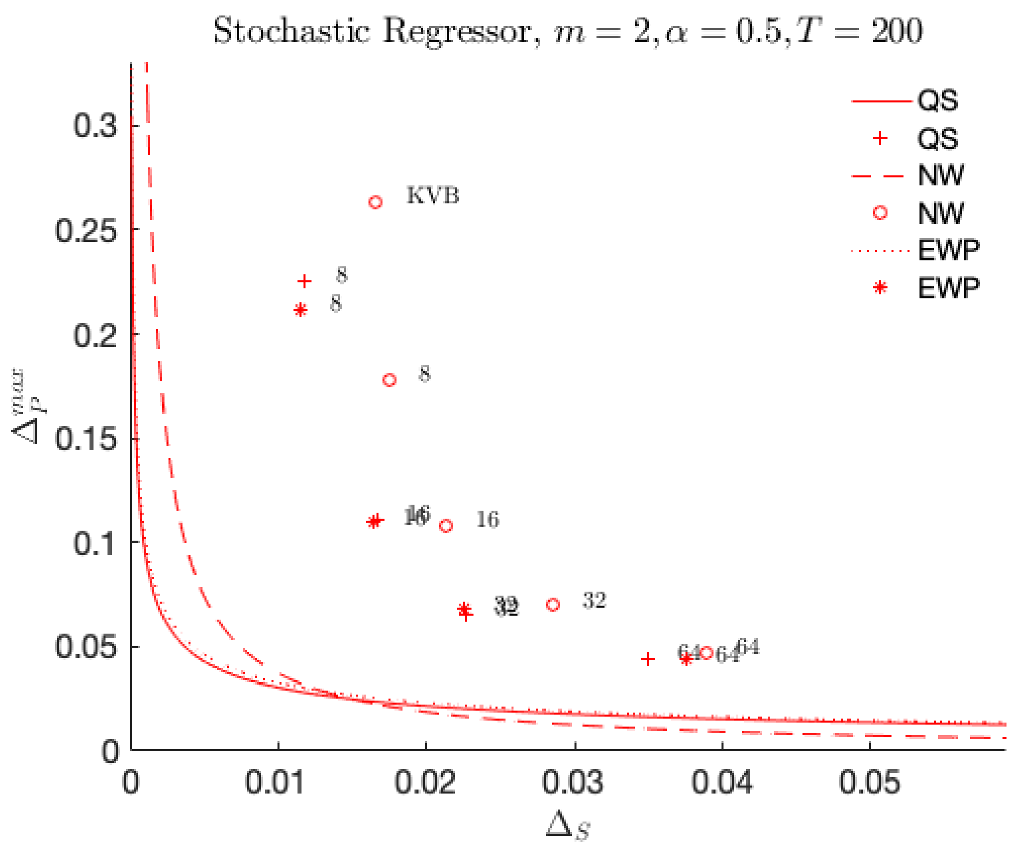

Figure S.8. Stochastic regressor, AR(1), $m = 2$, $\rho = 0.5$, $T = 200$.
Theoretical size distortion/power loss trade-off curves for QS, Newey-West, and EWP estimators with Monte Carlo results. *Note*: Curves are for the Gaussian location model.