Federal Reserve Bank of Minneapolis
Research Department Staff Report 309

June 2005

SMALL SAMPLE APPENDIX: A Critique of Structural VARs Using Business Cycle Theory*

V. V. Chari
University of Minnesota
and Federal Reserve Bank of Minneapolis

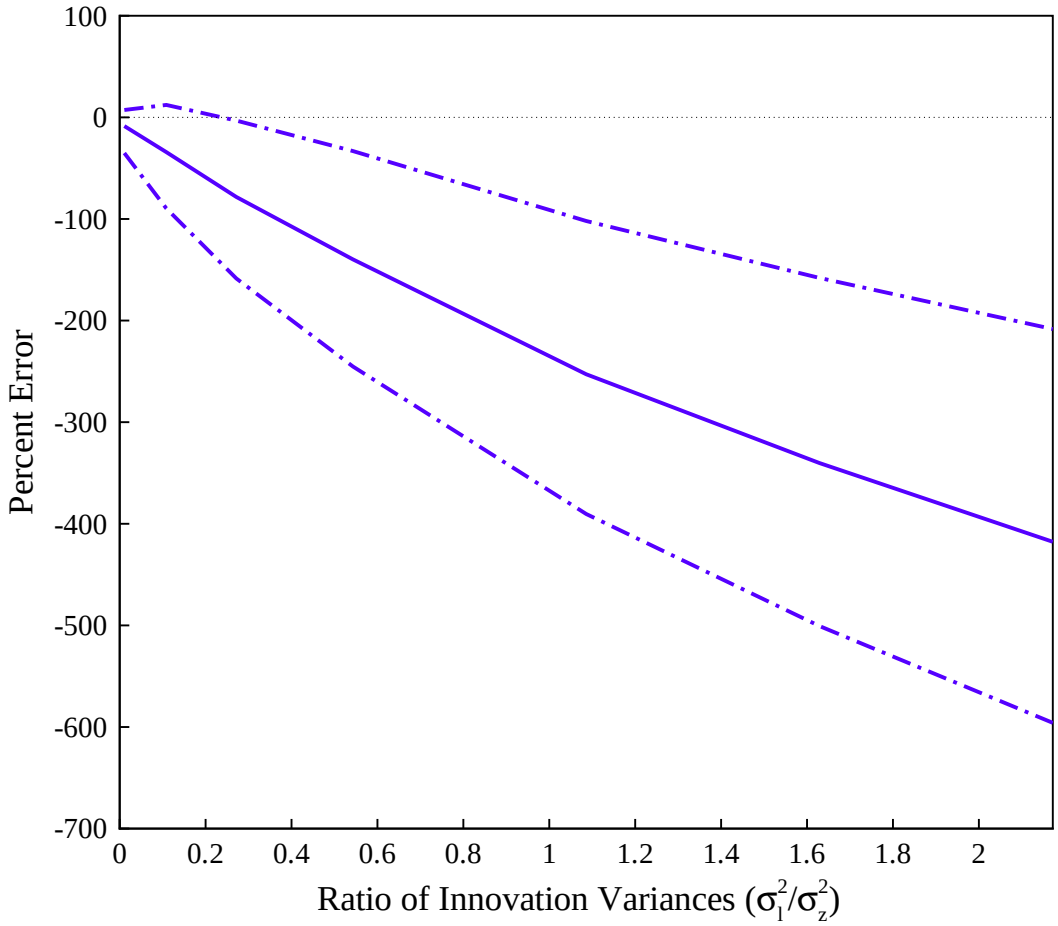
Patrick J. Kehoe
Federal Reserve Bank of Minneapolis
and University of Minnesota

Ellen R. McGrattan
Federal Reserve Bank of Minneapolis
and University of Minnesota

In this appendix, we report small sample results for the impulse response of hours to a technology shock as we vary parameters of the shock processes. We show both the combined errors (combining specification error and small sample bias) of impulse responses on impact and impulse response half-lives. In all cases, the model's impact coefficient is the same (.44% in response to a 1% shock to total factor productivity) and the model's half-life is the same (18.15 quarters).

FIGURE A1

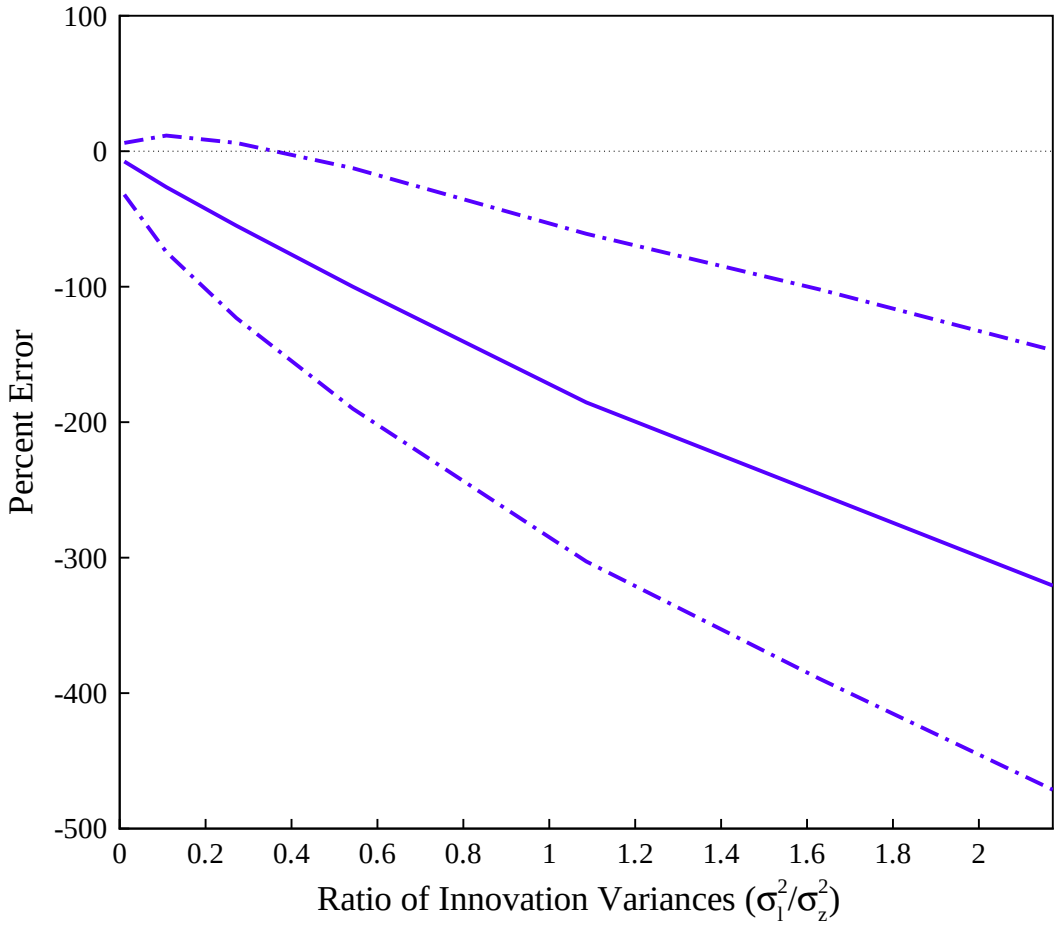
Combined Error in the Mean Impact Coefficient (solid line) and the Mean of 95% Bootstrapped Confidence Bands (dashed lines) Averaged Across 1,000 Applications of the Four-Lag QDSVAR Procedure with $\rho = .95$ to Model Simulations of Length 180, Varying the Ratio of Innovation Variances



NOTE: The combined error is defined to be the percent error in the small sample SVAR response of hours to technology on impact relative to the model's theoretical response. This error combines the specification error and the small sample bias.

FIGURE A2

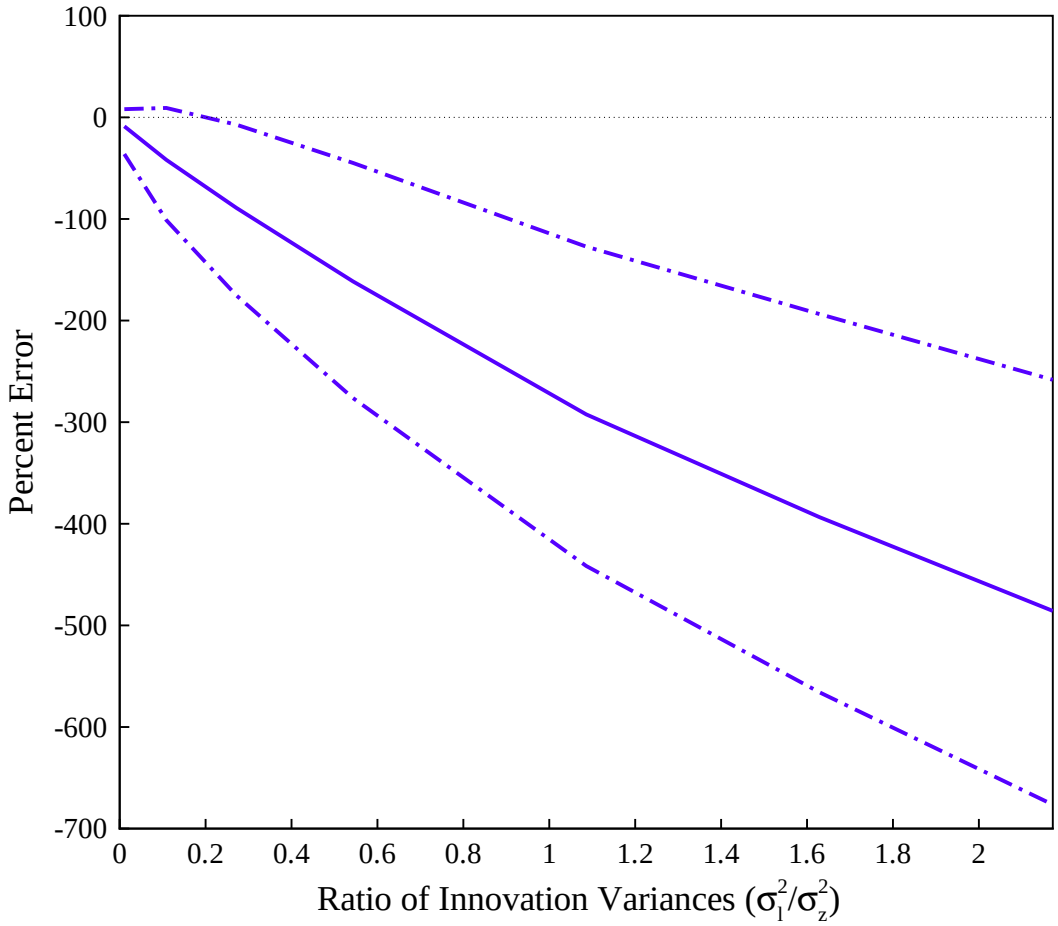
Combined Error in the Mean Impact Coefficient (solid line) and the Mean of 95% Bootstrapped Confidence Bands (dashed lines) Averaged Across 1,000 Applications of the Four-Lag QDSVAR Procedure with $\rho = .99$ to Model Simulations of Length 180, Varying the Ratio of Innovation Variances



NOTE: The combined error is defined to be the percent error in the small sample SVAR response of hours to technology on impact relative to the model's theoretical response. This error combines the specification error and the small sample bias.

FIGURE A3

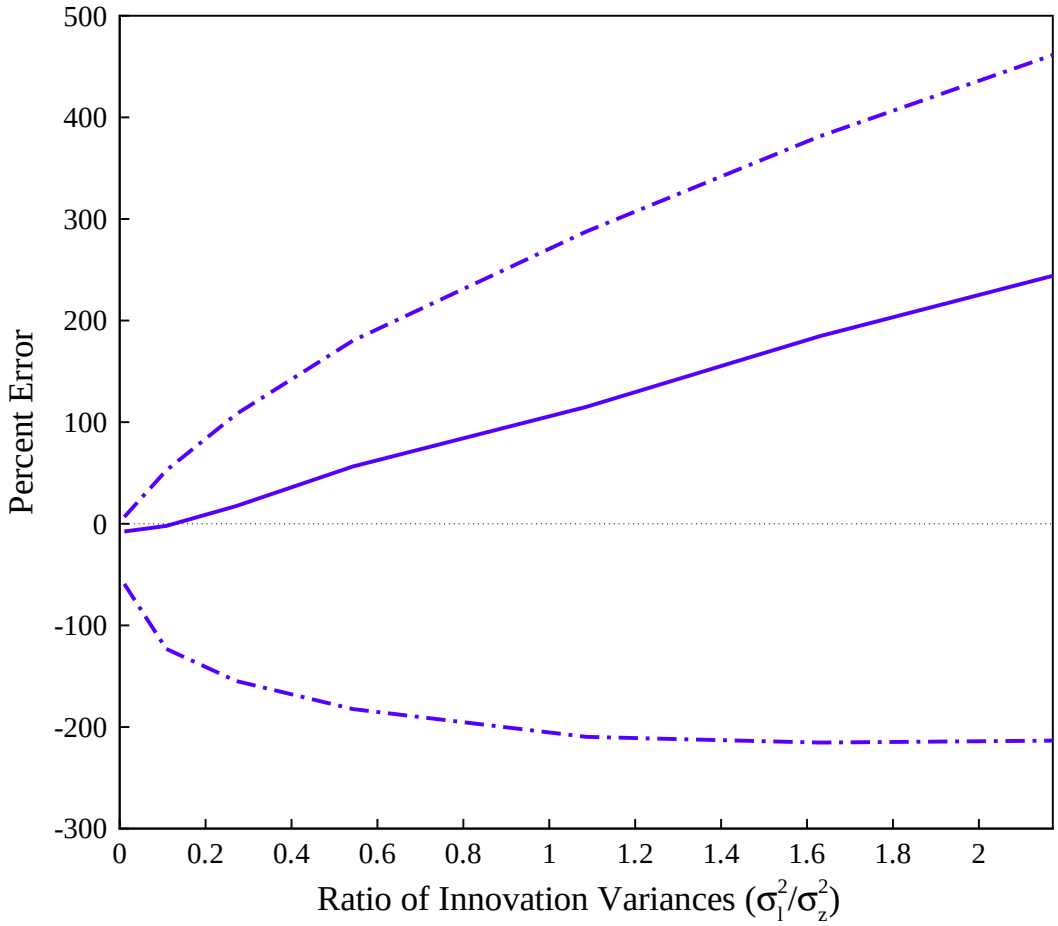
Combined Error in the Mean Impact Coefficient (solid line) and the Mean of 95% Bootstrapped Confidence Bands (dashed lines) Averaged Across 1,000 Applications of the Four-Lag QDSVAR Procedure with $\rho = .9$ to Model Simulations of Length 180, Varying the Ratio of Innovation Variances



NOTE: The combined error is defined to be the percent error in the small sample SVAR response of hours to technology on impact relative to the model's theoretical response. This error combines the specification error and the small sample bias.

FIGURE A4

Combined Error in the Mean Impact Coefficient (solid line) and the Mean of 95% Bootstrapped Confidence Bands (dashed lines) Averaged Across 1,000 Applications of the Four-Lag LSVAR Procedure with $\rho = .95$ to Model Simulations of Length 180, Varying the Ratio of Innovation Variances



NOTE: The combined error is defined to be the percent error in the small sample SVAR response of hours to technology on impact relative to the model's theoretical response. This error combines the specification error and the small sample bias.

FIGURE A5

Mean Half-Lives of Impulse Responses (solid line) and the Mean of 95% Bootstrapped Confidence Bands (dashed lines) Averaged Across 1,000 Applications of the Four-Lag LSVAR Procedure with $\rho = .95$ to Model Simulations of Length 180, Varying the Ratio of Innovation Variances

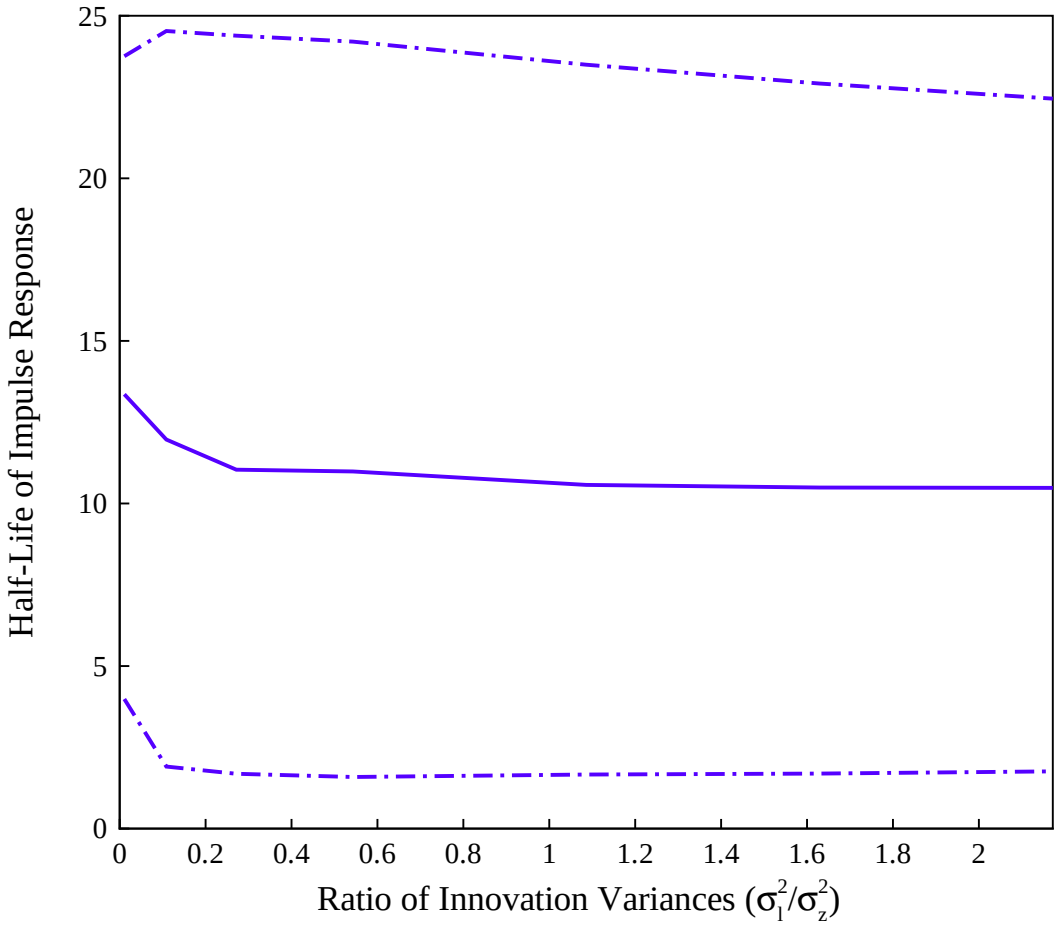
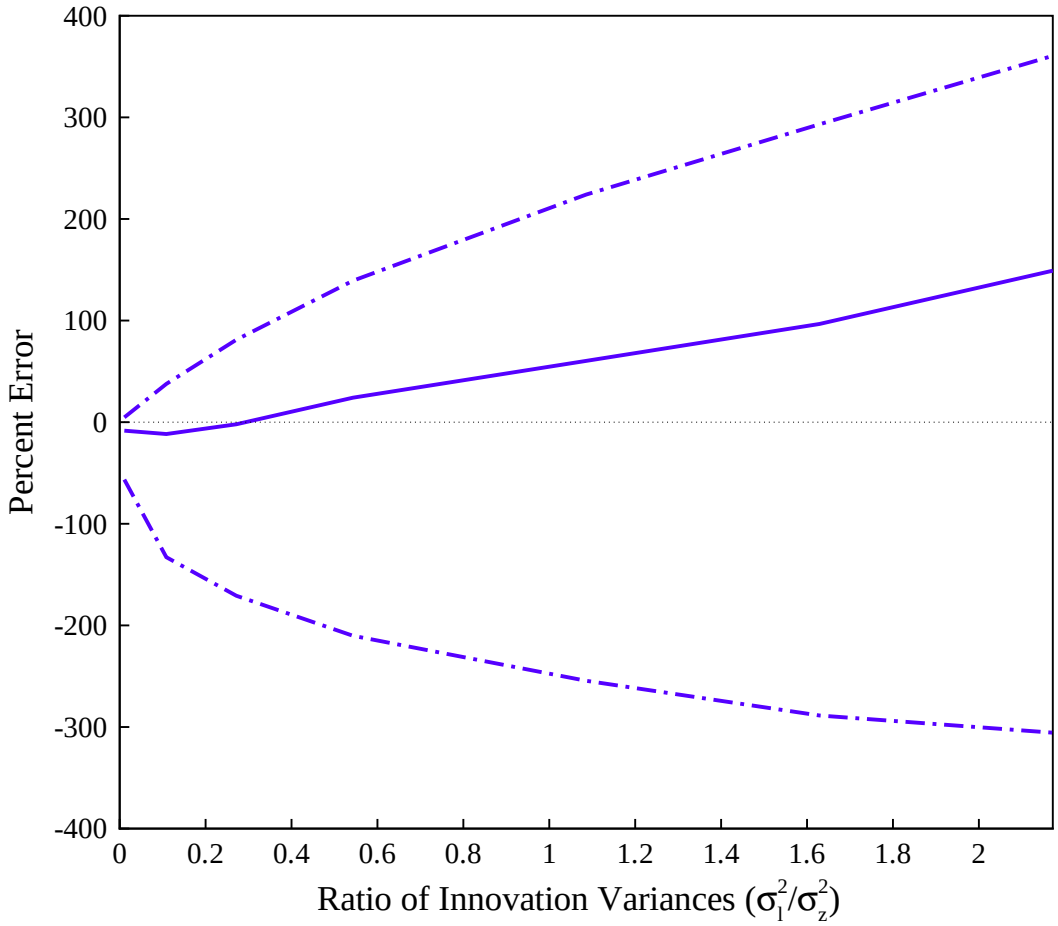


FIGURE A6

Combined Error in the Mean Impact Coefficient (solid line) and the Mean of 95% Bootstrapped Confidence Bands (dashed lines) Averaged Across 1,000 Applications of the Four-Lag LSVAR Procedure with $\rho = .99$ to Model Simulations of Length 180, Varying the Ratio of Innovation Variances



NOTE: The combined error is defined to be the percent error in the small sample SVAR response of hours to technology on impact relative to the model's theoretical response. This error combines the specification error and the small sample bias.

FIGURE A7

Mean Half-Lives of Impulse Responses (solid line) and the Mean of 95% Bootstrapped Confidence Bands (dashed lines) Averaged Across 1,000 Applications of the Four-Lag LSVAR Procedure with $\rho = .99$ to Model Simulations of Length 180, Varying the Ratio of Innovation Variances

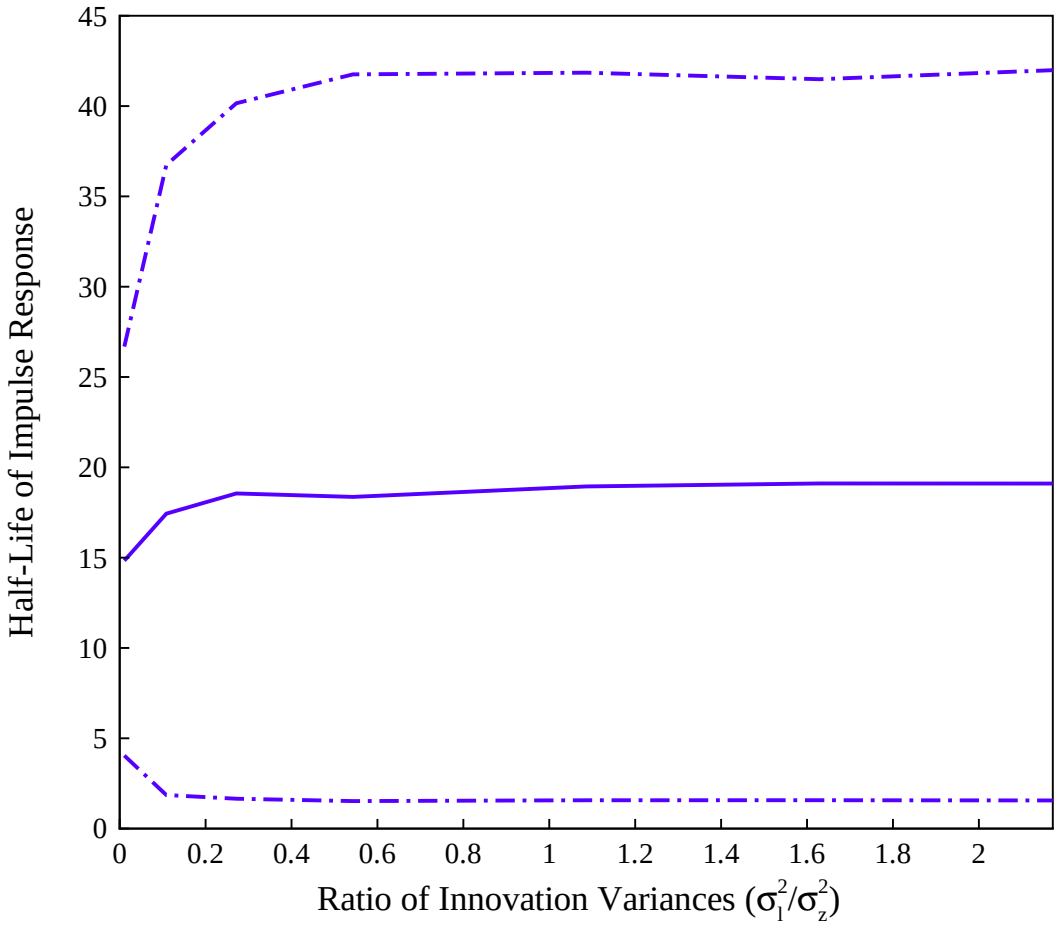
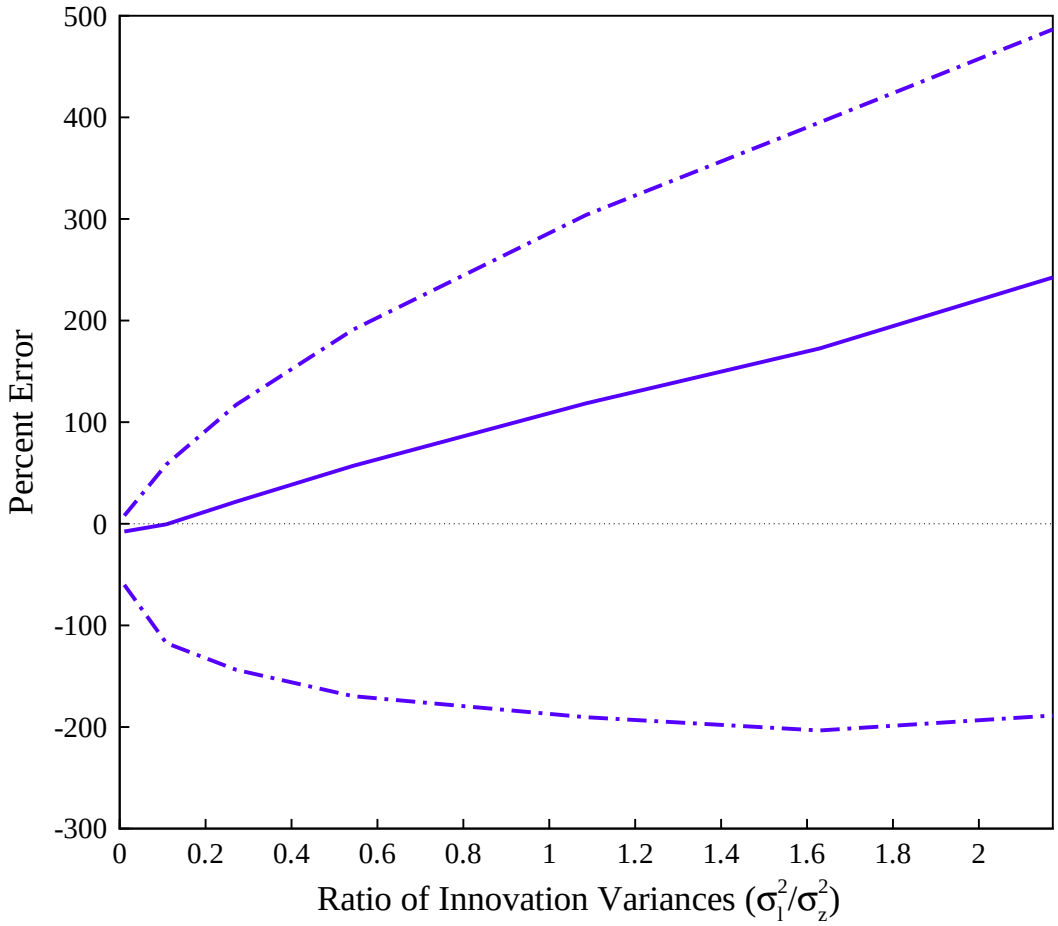


FIGURE A8

Combined Error in the Mean Impact Coefficient (solid line) and the Mean of 95% Bootstrapped Confidence Bands (dashed lines) Averaged Across 1,000 Applications of the Four-Lag LSVAR Procedure with $\rho = .9$ to Model Simulations of Length 180, Varying the Ratio of Innovation Variances



NOTE: The combined error is defined to be the percent error in the small sample SVAR response of hours to technology on impact relative to the model's theoretical response. This error combines the specification error and the small sample bias.

FIGURE A9

Mean Half-Lives of Impulse Responses (solid line) and the Mean of 95% Bootstrapped Confidence Bands (dashed lines) Averaged Across 1,000 Applications of the Four-Lag LSVAR Procedure with $\rho = .9$ to Model Simulations of Length 180, Varying the Ratio of Innovation Variances