

# BCA Replication: Classical VAR IRFs, Bootsstrapped

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## Replication of the Bootstrapped VARs

Using a resampled bootstrap method (drawing from VAR errors with replacement), the bootstrapped IRFs look very close to the original BCA IRFs.

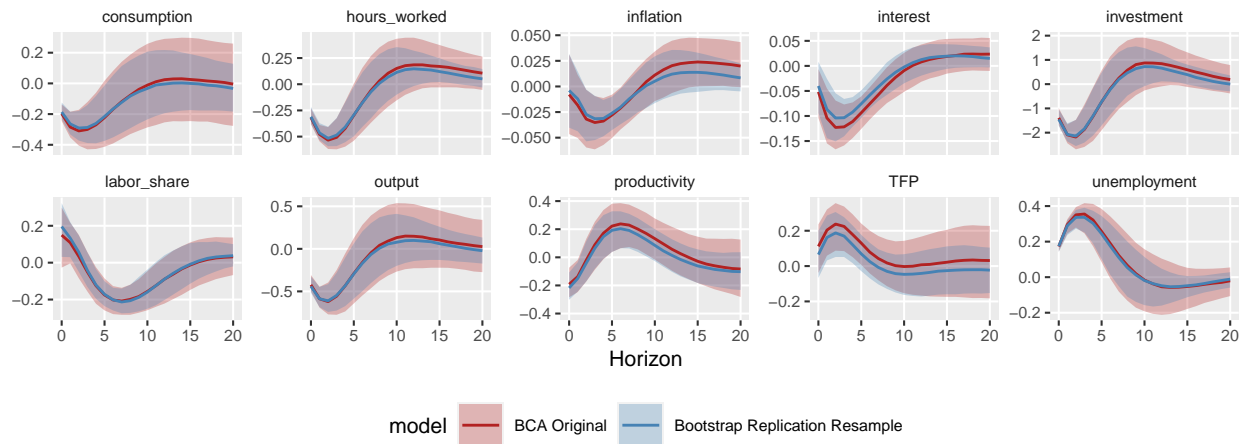


Figure 1: Comparison of Replicated IRF to Original, Resample Bootstrap

The original BCA paper also bias-adjusts their bootstraps, through a method called bootstrap-after-bootstrap. Implementing this makes the replicated IRFs even close to the original BCA IRFs.

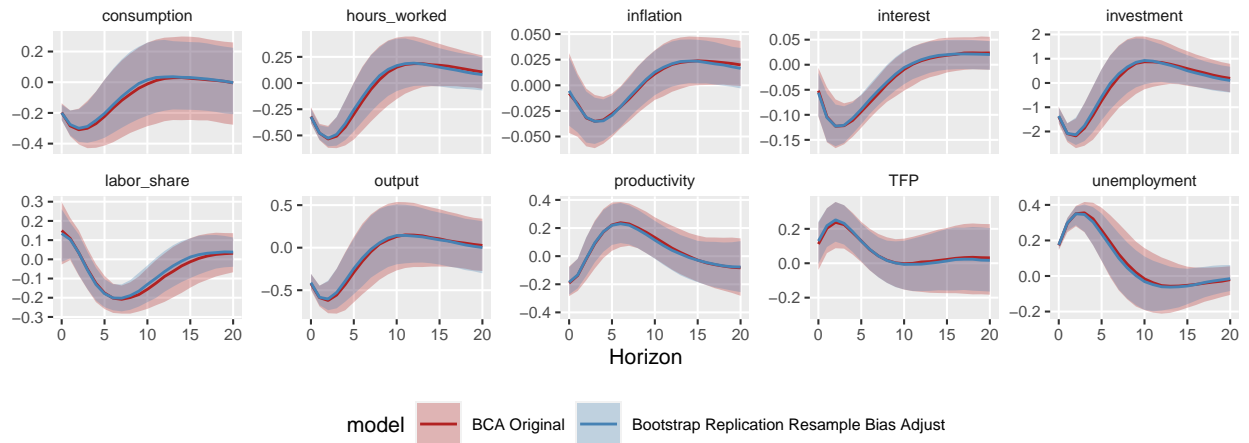


Figure 2: Comparison of Replicated IRF to Original, Resample Bootstrap, Bias adjusted

## Comparison to Wild Bootstrap

Using the Wild bootstrap with the gaussian distribution (multiply the errors by a random vector drawn from  $N(0,1)$ ), the impulse responses are very different from the original BCA results.

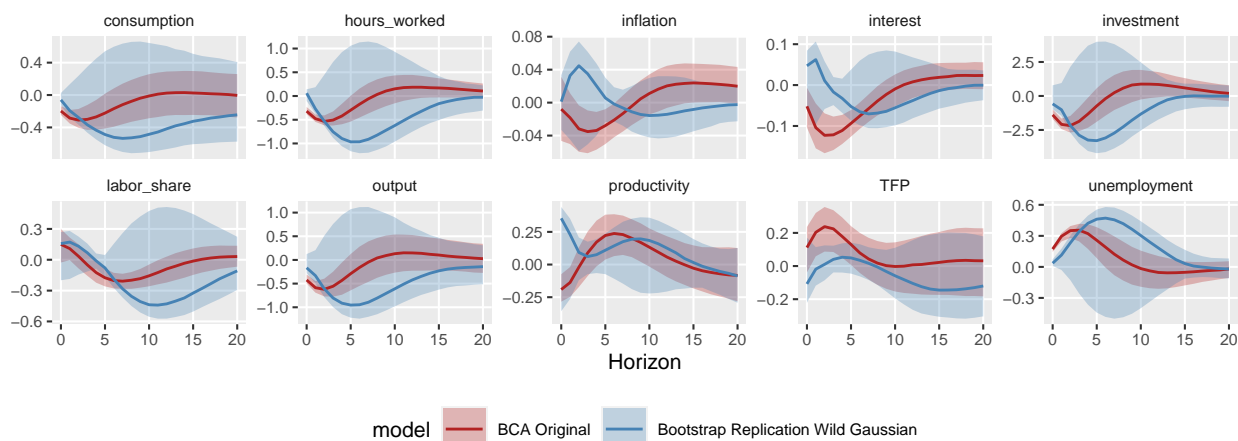


Figure 3: Comparison of Replicated IRF to Original, Wild Bootstrap, Gaussian, nboot = 1000

This remains true even if the number of bootstrap iterations are doubled. There is almost no different between 1000 and 2000 iterations.

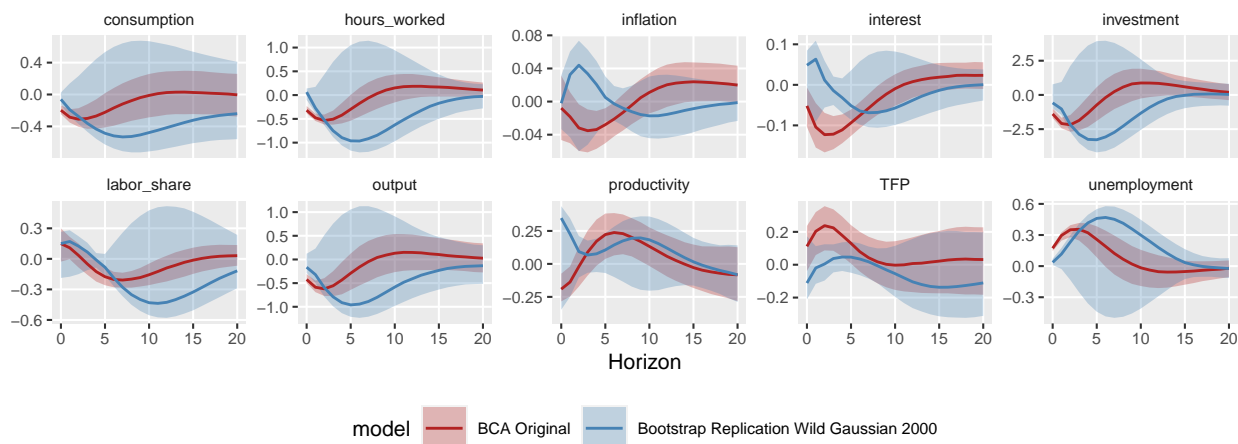


Figure 4: Comparison of Replicated IRF to Original, Wild Bootstrap, Gaussian, nboot = 2000

Another distribution can be used in the Wild bootstrap method, “Rademacher” simply multiplies the VAR errors by a random vector of -1s and 1s.

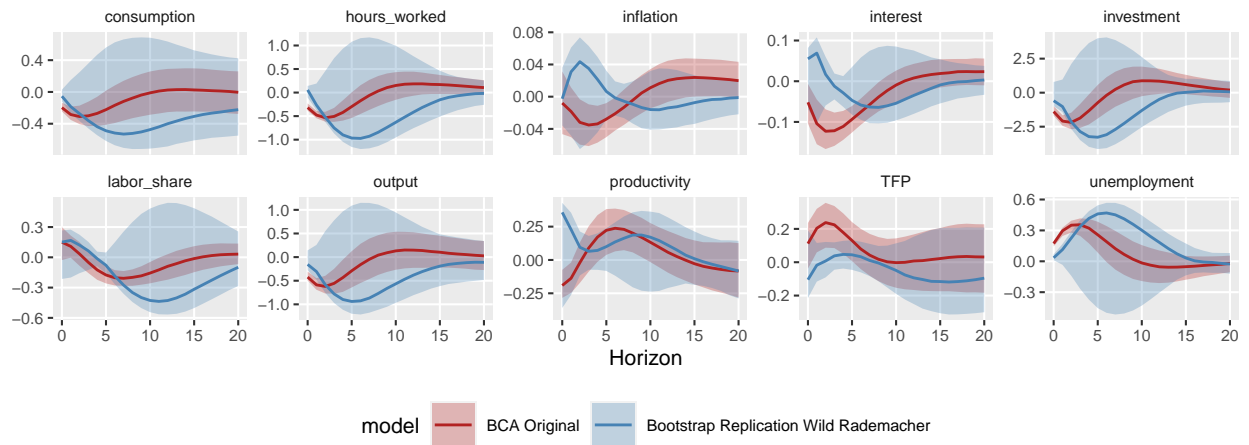


Figure 5: Comparison of Replicated IRF to Original, Wild Bootstrap, Rademacher