

BCA Replication: Bayesian VAR IRFs

Matthew DeHaven

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What is being replicated

The goal is to replicate Figure 1 of “Business Cycle Anatomy”, copied below.

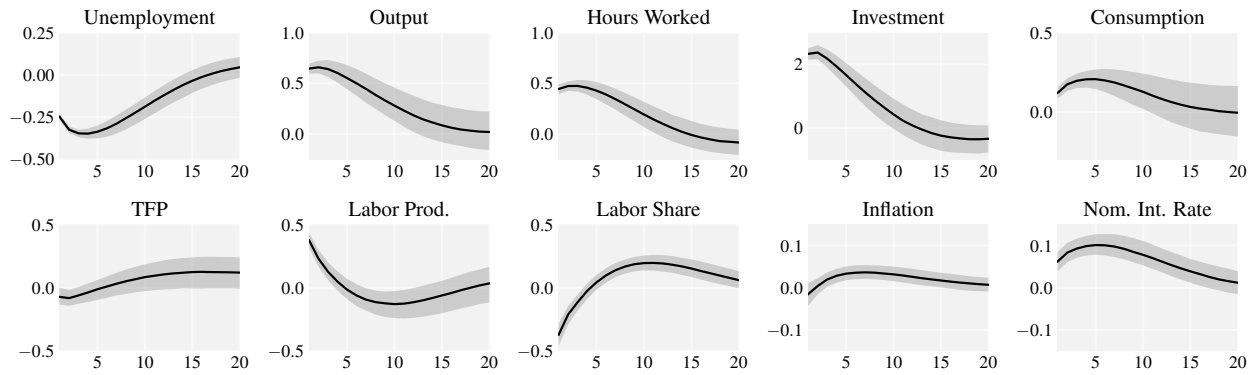


Figure 1: Impulse Response Functions to the MBC Shock

The black line shows the median Bayesian posterior distribution of the IRF at that horizon. The shaded area shows the 16th to 84th percentile of that distribution.

Frequency Domain Replication - bvartools package

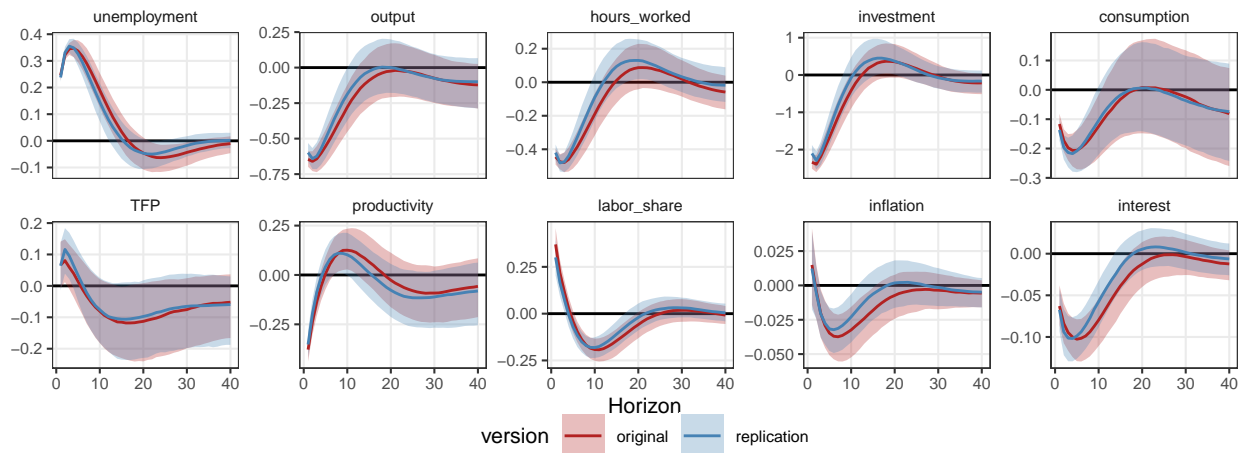


Figure 2: Replication of Bayesian VAR targeting Frequency Domain

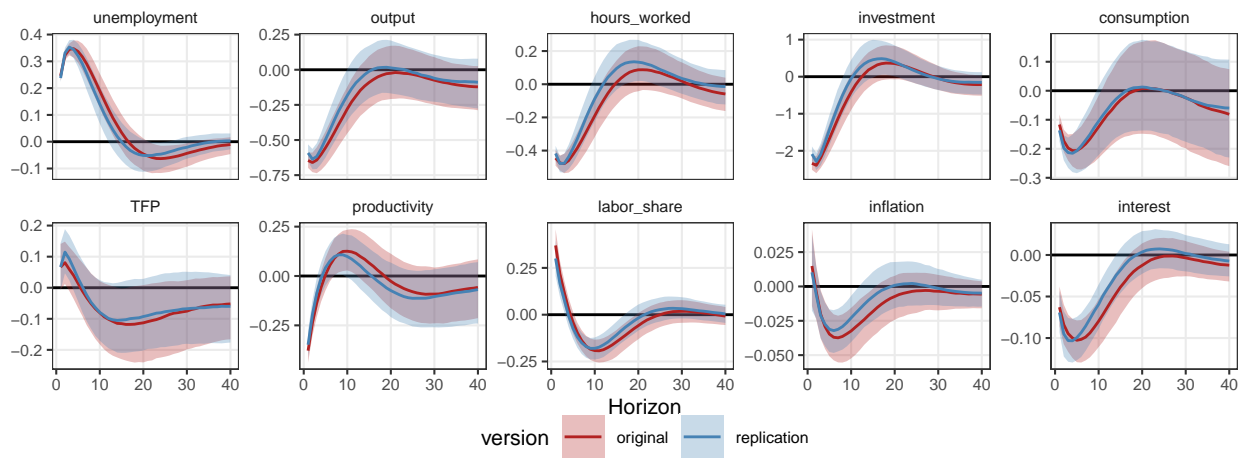


Figure 3: Replication of Bayesian VAR targeting Frequency Domain, 1000 burnin (small)

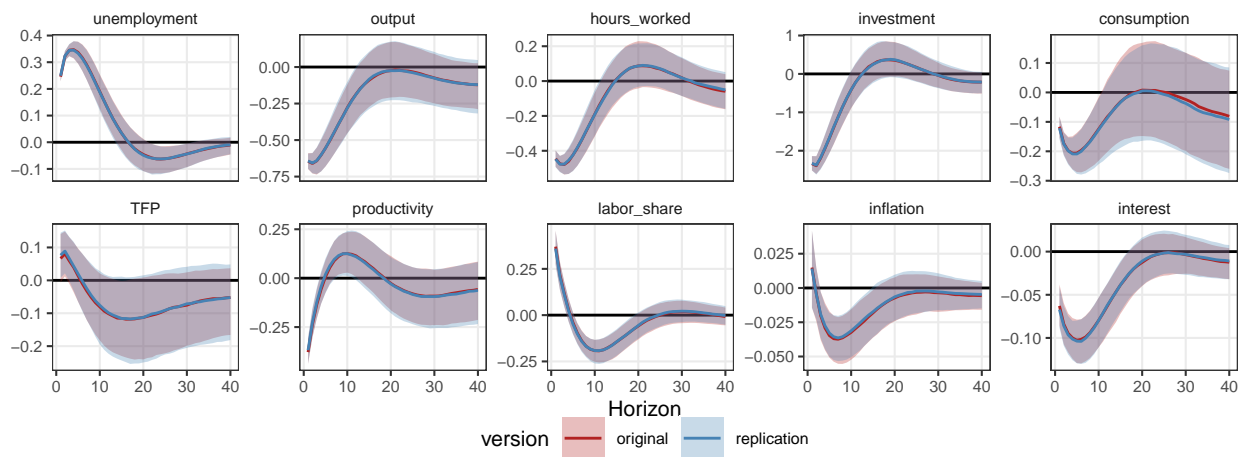


Figure 4: Replication of Bayesian VAR targeting Frequency Domain, exact priors

Time Domain Replication - bvartools package

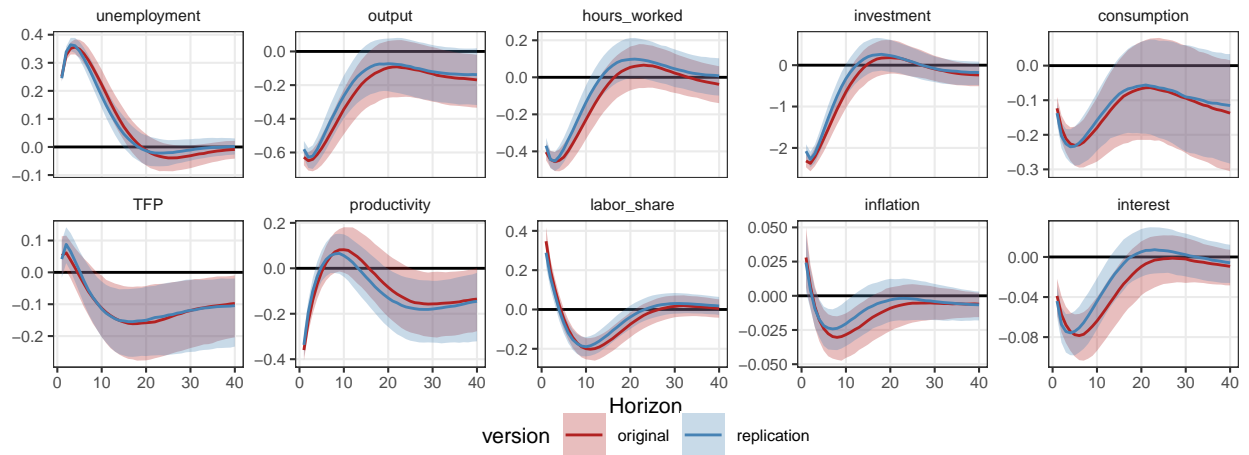


Figure 5: Replication of Bayesian VAR targeting Time Domain: 4

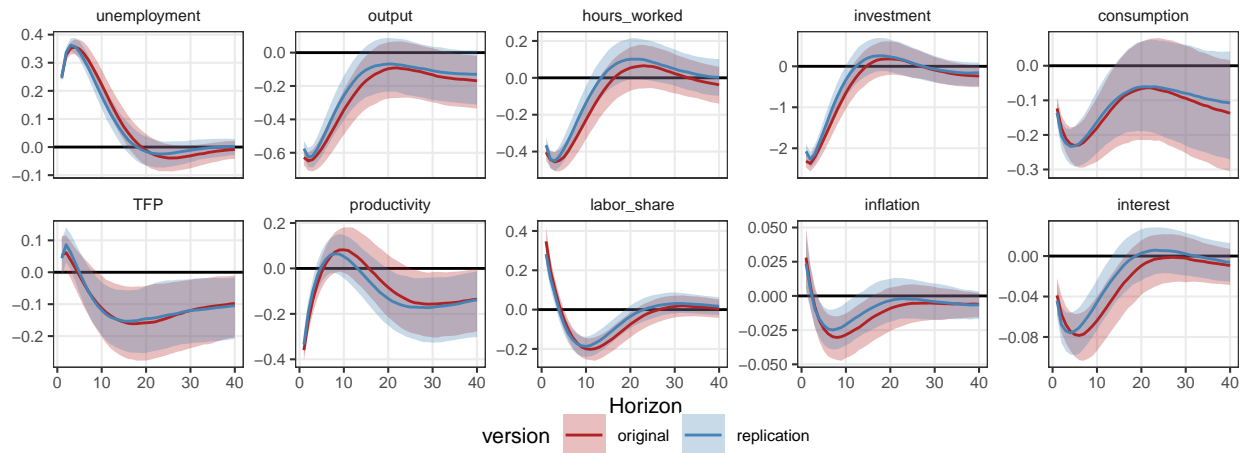


Figure 6: Replication of Bayesian VAR targeting Time Domain: 4, 1000 burnin (small)

For the next three plots, the replication only targets a time horizon of 32, instead of the full range of 6:32, as the original BCA code does not correctly target the full range.

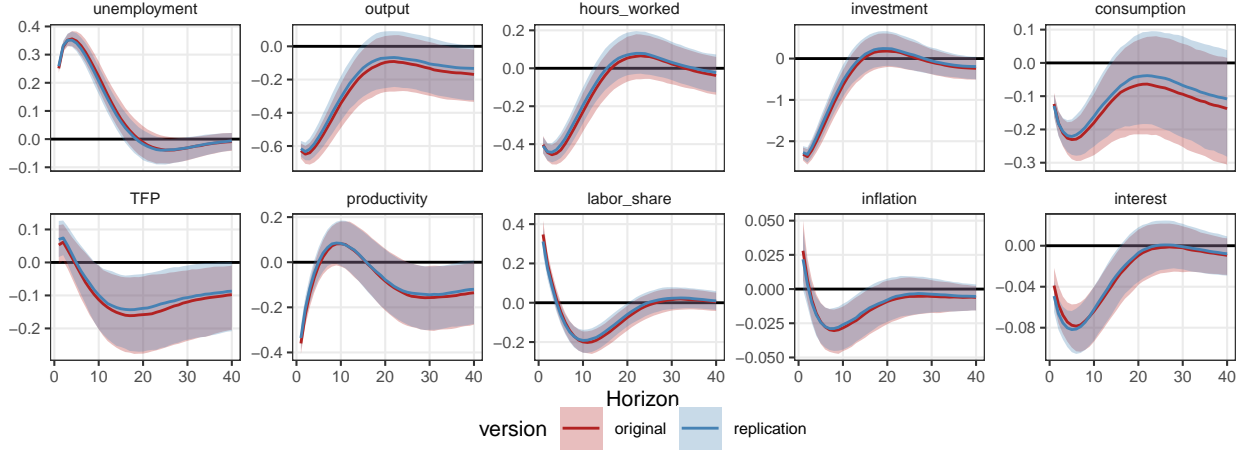


Figure 7: Replication of Bayesian VAR targeting Time Domain: 4, exact priors

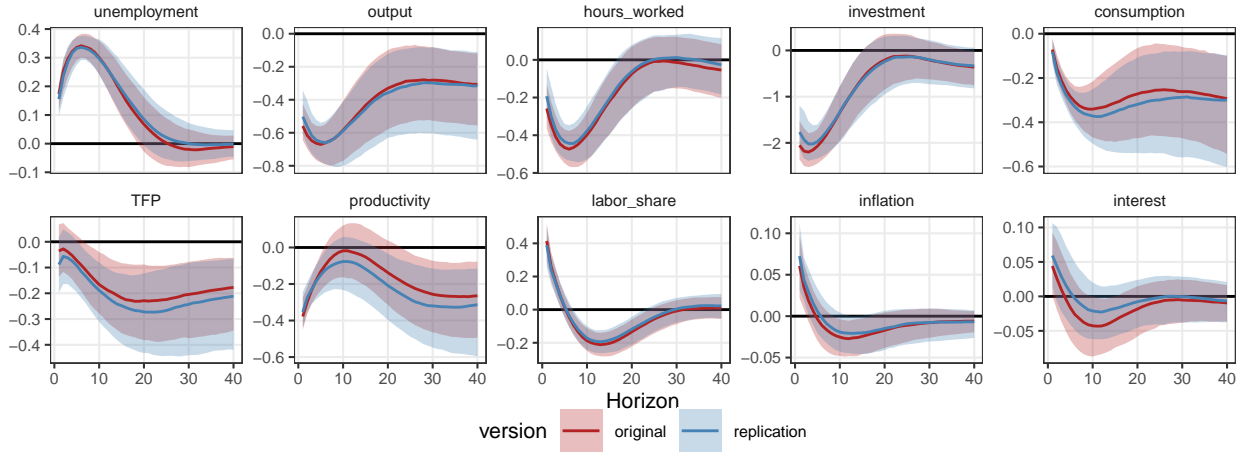


Figure 8: Replication of Bayesian VAR targeting Time Domain: 6:32

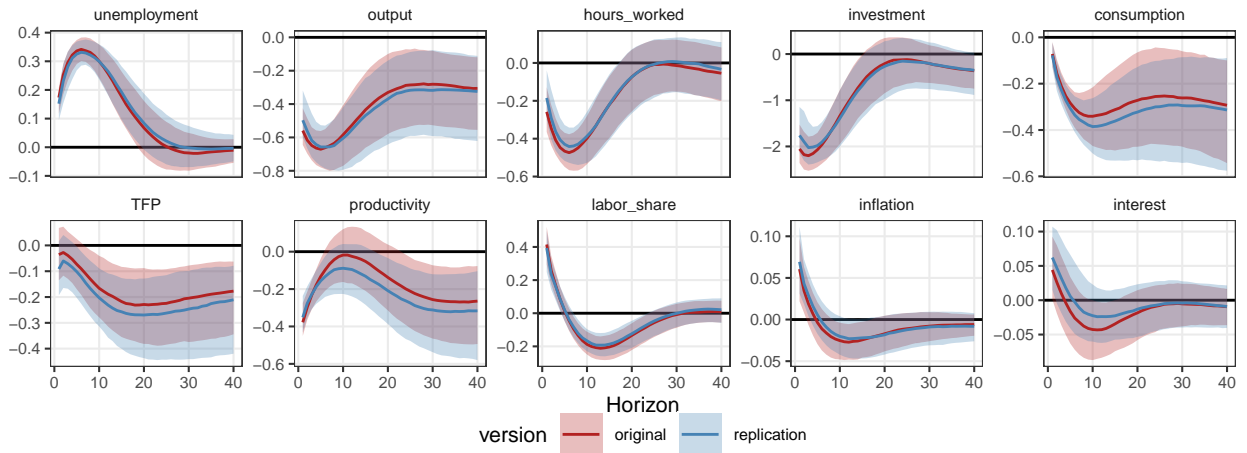


Figure 9: Replication of Bayesian VAR targeting Time Domain: 6:32, 1000 burnin (small)

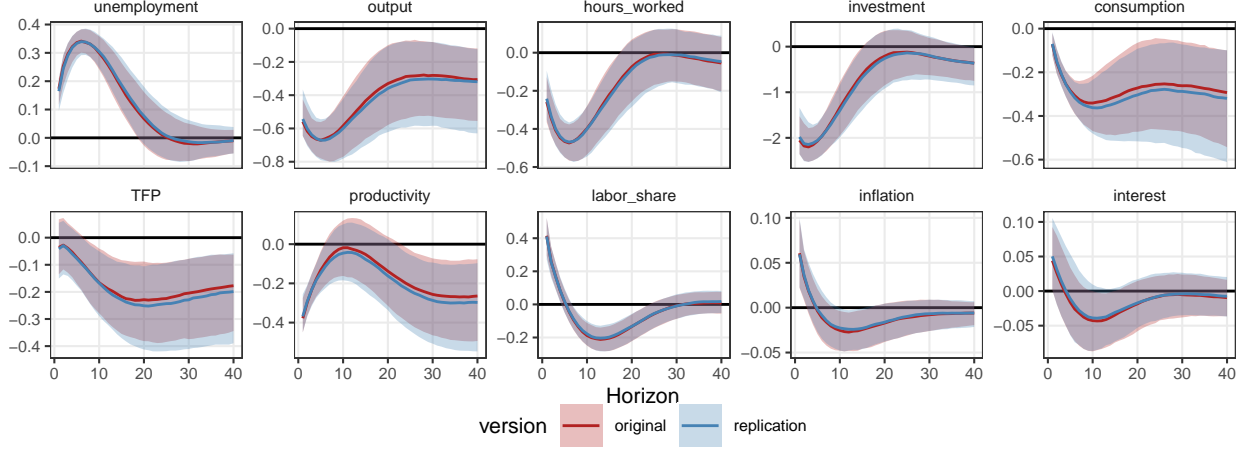


Figure 10: Replication of Bayesian VAR targeting Time Domain: 6:32, exact priors

Frequency Domain Replication - BVAR package

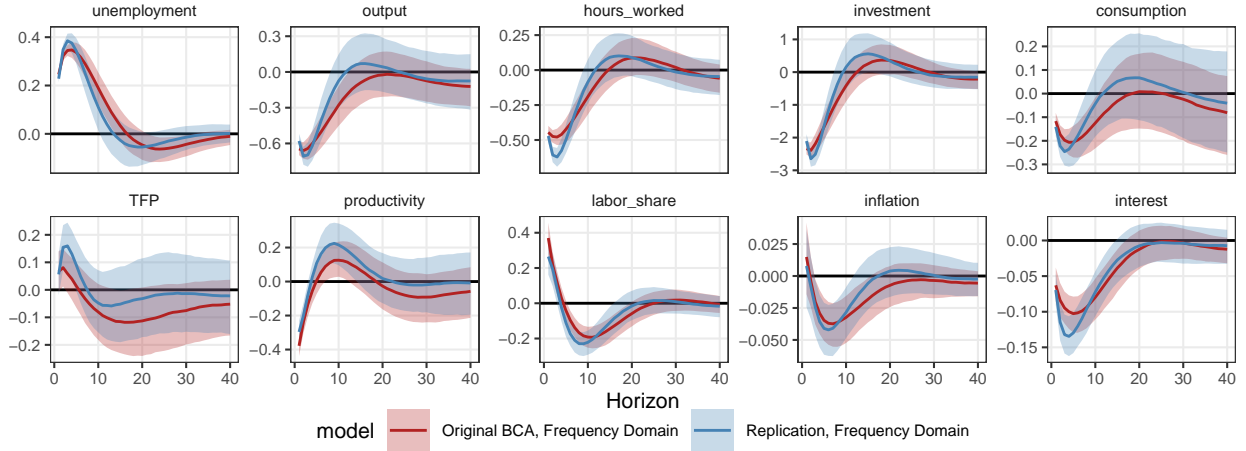


Figure 11: Replication of Bayesian VAR targeting Frequency Domain

Time Domain Targetting - BVAR package

In addition, the original paper compares targetting the time domain to the frequency domain.

They argue that targetting a horizon of 4 is the most similar to the frequency domain result from above. The below plot compares a replication of a Bayesian VAR targetting a horizon of 4.

The authors argue that targetting a horizon of 6 to 32 (to match the frequencies of $2\pi / 6$ to $2\pi / 32$) would be naive and does not give the closest matched IRF. However, their code incorrectly targets only the 32nd horizon, not the full range. Thus in comparing the replication below, I target the 32nd horizon.

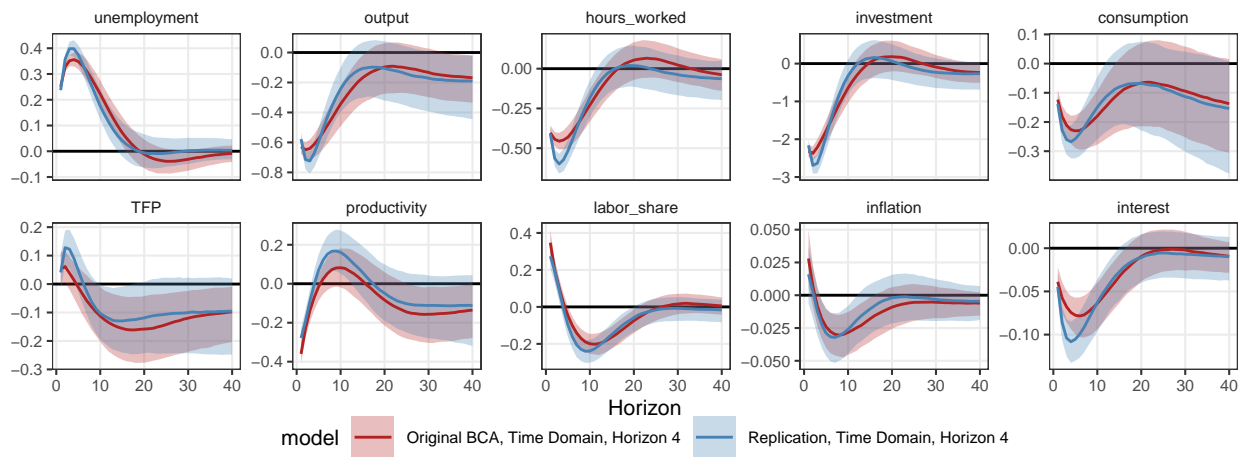


Figure 12: Replication of Bayesian VAR targetting Time Domain, Horizon 4

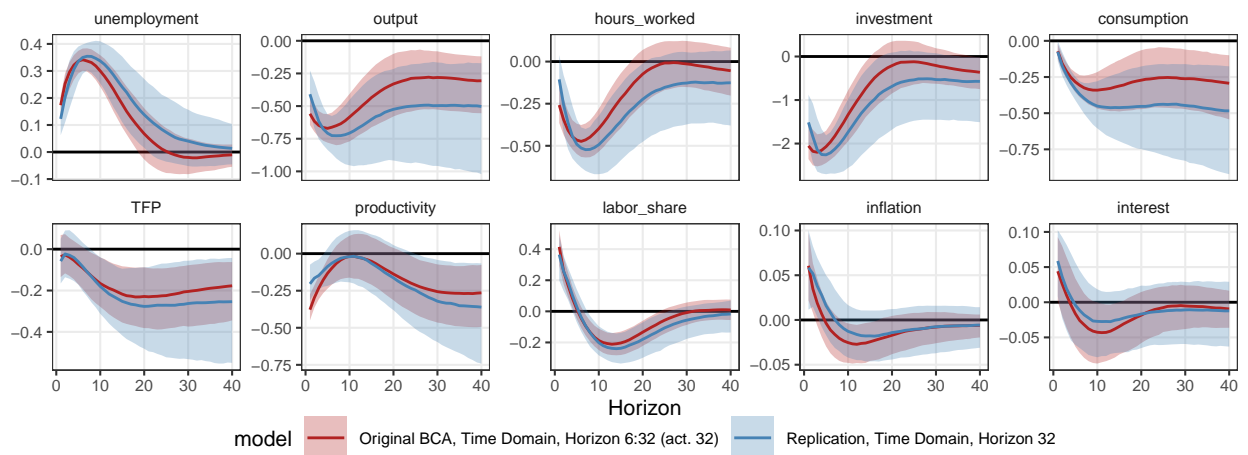


Figure 13: Replication of Bayesian VAR targetting Time Domain, Horizon 32