

Replication Package for

Revisiting Oil Supply News Shocks: Proxy vs. Non-Gaussian Structural Vector Autoregressions

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This replication package accompanies the article Helmut Lütkepohl and Till Strohsal, *Revisiting Oil Supply News Shocks: Proxy vs. Non-Gaussian Structural Vector Autoregressions*, accepted for publication in the *Journal of Applied Econometrics*.

Data Availability and Provenance Statements

Statement about Rights

The authors have legitimate access to and permission to use all data employed in this study.

Summary of Availability

All data used in the analysis are publicly available and included in the replication package.

Details on Each Data Source

All raw and processed data originate from the publicly available replication package of Känzig (2021), available via <https://doi.org/10.3886/E122886V1>.

All additional data files contained in the present replication package are derived from these original sources using the scripts described below. No proprietary or restricted-access data are used.

Dataset List

Data file / Folder	Source	Notes
1_Kaenzig_replication/data	Känzig (2021)	Original replication data
2_This_papers_replication/ Data/kaenzig_exports/	Generated	Inputs exported from Känzig's code
2_This_papers_replication/ Data/thispaper_exports/	Generated	Intermediate results from this paper's code

Folder Structure

The replication package is organized as follows:

- `1_Kaenzig_replication/`: Känzig's (2021) original replication package. All original files are left unchanged. We only add two clearly named MATLAB files, `s03_figures3_5_nested.m` and `runProxyVAR_nested.m`, which generate the nested bootstrap required for the shock-equality test.
- `2_This_papers_replication/`: Code, data exports, and outputs for the present study.
 - `Code/`: MATLAB and R scripts.
 - `Data/`: Generated intermediate files.
 - `Output/`: Final tables and figures.
- `3_README/`: Documentation file.

Description of Programs and Code

The replication workflow is organized in three stages. Stages A and B generate the inputs and estimates; stage C generates the main tables and figures. The independence tests and the shock-equality test are produced directly in stage B.

A: MATLAB Scripts to replicate and store Känzig's results

- `A1_export_kaenzig_baseline.m`: Exports baseline results from Känzig's replication package.
- `A2_export_kaenzig_extensions.m`: Exports results from the extended models.
- `A3_export_structural_shocks_baseline_and_extensions.m`: Calculates and exports structural shocks from baseline and extended models.

B: Scripts to replicate and store this paper’s results

- `B1_nonGaussian_SVAR_baseline.R`: Estimates the baseline non-Gaussian SVAR.
- `B2_Independence_Tests.R`: Computes the pairwise BRS, SRB, and MOPMQ independence tests for the baseline structural shocks.
- `B3_1_export_kaenzig_nested_bootstrap.m`: Exports Känzig’s outer and inner bootstrap objects required for the shock-equality test.
- `B3_2_Shock_Equality_Test.R`: Computes the nested-bootstrap Wald test of equality between the normalized Känzig and non-Gaussian impact vectors.
- `B4_nonGaussian_SVAR_extensions.R`: Estimates the extended non-Gaussian SVARs.

C: MATLAB Script to generate the paper outputs

- `C1_make_paper_outputs.m`: Generates the remaining final tables and figures. The Jarque–Bera results report the joint test and its skewness and kurtosis components separately.

Helper Libraries

Auxiliary MATLAB functions are contained in `A3_lib/` and `C1_lib/`.

Computational Requirements

Software Requirements

- MATLAB: Version 24.2 (R2024b) Update 3.
- Required MATLAB Toolboxes:
 - Econometrics Toolbox
 - Optimization Toolbox
 - Statistics and Machine Learning Toolbox
 - Global Optimization Toolbox
 - Symbolic Math Toolbox
- R: Version 4.5.2.
- Required R packages: `svars`, `vars`, `lmtest`, `urca`, `sandwich`, `zoo`, `MASS`, `energy`, `rhdf5`, and dependencies. The R package `rhdf5` is available from Bioconductor and can be installed using `BiocManager::install("rhdf5", update=FALSE)`.
- Operating System: Microsoft Windows 11 Enterprise LTSC (Build 26100).

Memory and Runtime Requirements

- Most scripts can be run on a standard desktop computer with moderate memory requirements.
- `B2_Independence_Tests.R` can take substantial time because the BRS test is computationally intensive.
- `B3_2_Shock_Equality_Test.R` is exceptionally time-consuming. The reported specification uses 1,000 outer and 100 inner bootstrap replications and required more than 10 days on the authors' computer. The script saves checkpoints and can resume an interrupted run.
- The generated B3 inputs and final B3 result are included in the replication package; rerunning B3 from scratch is therefore optional.

Instructions to Replicators

Replication proceeds in three stages: A, B, and C. Generated intermediate files are stored under `Data/`; final tables and figures are stored under `Output/`.

Step A: Generate Känzig-Based Inputs (MATLAB)

Step A has already been run and its generated inputs are included in the replication package. It is described here so that replicators can also regenerate the Känzig-based inputs from the original replication archive.

1. Set the working directory to `1_Kaenzig_replication/codes/`.
2. Run `s03_figures3_5.m`.
3. Set the working directory to `2_This_papers_replication/Code/`.
4. Run `A1_export_kaenzig_baseline.m`.
5. Set the working directory back to `1_Kaenzig_replication/codes/`.
6. Run `s06_figures6_8_9a_10_11.m`.
7. Set the working directory to `2_This_papers_replication/Code/`.
8. Run `A2_export_kaenzig_extensions.m`.
9. Run `A3_export_structural_shocks_baseline_and_extensions.m`.

Step B: Estimate This Paper's Models and Tests

In R, Set the working directory to `2_This_papers_replication/Code/`.

1. Run `B1_nonGaussian_SVAR_baseline.R` in R.

2. Run `B2_Independence_Tests.R` in R.
3. For a full replication of the shock-equality test:
 - (a) In MATLAB, set the working directory to `1_Kaenzig_replication/codes/` and run `s03_figures3_5_nested.m`. This is an added file and leaves Känzig's original code unchanged. It calls the added `runProxyVAR_nested.m` and creates the outer and inner Känzig bootstrap objects in the MATLAB workspace.
 - (b) In the same MATLAB session, set the working directory to `2_This_papers_replication/Code/` and run `B3_1_export_kaenzig_nested_bootstrap.m`. It saves `Data/kaenzig_exports/kaenzig_nested_bootstrap_exports.mat`.
 - (c) Run `B3_2_Shock_Equality_Test.R` in R.
4. Run `B4_nonGaussian_SVAR_extensions.R` in R.

B2 uses 249 permutations for BRS, 499 permutations for SRB, and 2,000 moving-block bootstrap replications for MOPMQ. The MOPMQ block length is 24 months. In each MOPMQ bootstrap replication the reduced-form VAR is re-estimated while the baseline structural impact matrix is kept fixed.

Important: The package already contains `kaenzig_nested_bootstrap_exports.mat` and the final shock-equality result. Thus, B3_1 and B3_2 need to be rerun only for a full replication of the shock-equality test from scratch. A full B3_2 run can take more than 10 days.

Step C: Generate Final Outputs (MATLAB)

In step C, the remaining results presented in the paper are summarized. Numerical results are printed to the MATLAB command window; figures are exported as PDF files and tables as CSV files.

1. Set the working directory to `2_This_papers_replication/Code/`.
2. Run `C1_make_paper_outputs.m`.

List of Tables, Figures, and In-Text Numbers

Most tables and figures reported in the main paper and appendix are generated by `C1_make_paper_outputs.m` using intermediate outputs from stages A and B. The pairwise independence-test results are generated by B2 and the shock-equality Wald test by B3_2.

Final outputs are stored in:

- `2_This_papers_replication/Output/figures/`
- `2_This_papers_replication/Output/tables/`

Contact and Usage

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This replication package is provided for academic and non-commercial research purposes.

References

- Känzig, D. (2021). “The Macroeconomic Effects of Oil Supply News: Evidence from OPEC Announcements.” *American Economic Review*, 111(4): 1092–1125.
Replication data: <https://doi.org/10.3886/E122886V1>.