

AI Assistance Disclosure

Generative AI tools, including ChatGPT, were used as coding assistants during the preparation of this replication package. Their use was limited to support with MATLAB/Dynare debugging, code organisation, comments, formatting, documentation, and the presentation of outputs. The author remained responsible for the research question, model equations, calibration choices, empirical design, data construction, execution of the scripts, verification of the generated results, and economic interpretation. AI-generated suggestions were reviewed before inclusion and were not treated as independent evidence or research findings.

Replication Package README

Heterogeneity as Transmission: Common Shocks, Wage Regimes, Inflation Divergence, and Policy Stance in a Two-Country Currency Union

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1. Purpose and scope

This package contains the files required to reproduce the reduced-form two-country Dynare/OccBin simulations, computational diagnostics, figures, tables, robustness exercises, and reduced-form empirical results reported in the study. Country H denotes Belgium and country F denotes Germany.

The files are intentionally kept as separate scripts. This preserves the working calculations, makes individual outputs easy to inspect, and avoids introducing new dependencies through a last-stage code merge.

2. Software requirements

- **MATLAB:** The code was run using MATLAB R2026a. MATLAB R2020a or later is recommended because several scripts use `exportgraphics`, `ylines`, `xlines`, and local functions.
- **Dynare:** Dynare 7.0, including the OccBin functionality distributed with Dynare.
- **Font:** Times New Roman is used for figure formatting. If unavailable, MATLAB may substitute another font without changing the calculations.
- **Interactive file selection:** The empirical scripts use `uigetfile`. They are intended to be run in the MATLAB desktop. In batch mode, replace the file-selection block with an explicit `data_path`.

3. Quick start

Model-side scripts

1. Place the final `.mod` file and all model-side MATLAB scripts in the same working folder.
2. Add Dynare 7.0 to the MATLAB path.
3. Run the final model first in the same MATLAB session:

```
dynare cleaned_reducedform_OCA.mod noclearall
```

4. Confirm that the steady state is obtained, the Blanchard-Kahn conditions pass, and `oo_.ocbin.simul.piecewise` exists.
5. Run each model figure or table script individually. The command `clearvars -except M_oo_options_` preserves the Dynare objects required by those scripts.

Robustness scripts

Run the robustness scripts directly from the folder containing `cleaned_reducedform_OCA.mod`. They create temporary model files and solve each case independently. The generated temporary models are stored in `robustness_tmp_models`, and the result tables are written to `robustness_outputs`.

Empirical scripts

Run each empirical script directly. A file-selection window will request the appropriate cleaned quarterly dataset. No user-specific absolute data path is required. The scripts validate the necessary variable names and stop with an explanatory error when required columns are missing.

4. Output folders

Folder	Contents
supervisor_figures	Dynare/OccBin model figures and explanatory diagnostics.
supervisor_tables	CSV and LaTeX tables generated from the baseline model.
robustness_outputs	CSV and Excel results from policy-rule and one-at-a-time robustness screens.
robustness_tmp_models	Temporary .mod files created during robustness runs. These files are intermediate and can be deleted after successful reproduction.
lp_figures	Local-projection figures and coefficient tables, created beside the selected empirical dataset.
theta_figures	Tightness, wage, and estimated-kink figures and tables, created beside the selected empirical dataset.

5. File map and running order

5.1 Baseline model, diagnostics, figures, and tables

File	Purpose	Primary output
cleaned_reducedform_OCA.mod	Final reduced-form two-country Dynare/OccBin model. Run before all baseline model-side scripts.	Baseline simulation
fig02_theta_threshold_clean_oldstyle.m	Plots actual tightness, the country-specific threshold, and regime entry/exit dates.	Threshold figure
fig03_wage_branch_selection_oldstyle.m	Verifies and plots selection between existing and flexible new-hire wage branches.	Wage-branch figure
fig04_inflation_marginal_cost_oldstyle.m	Checks $mc_i = w_{new,i} - a_i$ and plots marginal-cost and inflation transmission.	Inflation/MC figure
fig05_policy_mismatch_oldstyle.m	Constructs country shadow-rate benchmarks and policy gaps under the common ECB rate.	Policy-mismatch figure
fig06_kekre_tot_closure_oldstyle.m	Checks production, net activity, terms-of-trade, and relative-demand closure.	OCA-closure figure
fig_benigno_style_theta_inflation_kink.m	Builds a conditional model-implied inflation schedule over tightness at a selected period.	Kink illustration
table02_regime_summary_supervisor.m	Exports tight, slack, and borderline counts, regime blocks, and residual diagnostics.	Regime table
table03_mechanism_moments_supervisor.m	Exports periods 1-10 averages for the main transmission objects.	Mechanism-moments table

5.2 Robustness scripts

File	Purpose	Primary output
robust_policy_rule_screen.m	Joint grid over ω , ϕ_{pi} , and ϕ_y . Tests whether policy-mismatch results survive alternative common-rule calibrations.	Policy-rule screen
robust_calibration_one_at_a_time_screen.m	One-at-a-time screens for shock size, κ_p , ρ_u , $\lambda_{w,F}$, ξ_{trade} , and δ .	Structural robustness screen

5.3 Empirical scripts

File	Purpose	Primary output
first_lp_irf_inflation_formatted.m	Common cost-pressure shock to Belgian and German inflation, including the BE-DE asymmetry response.	Inflation LPs
first_lp_irf_inflation_country_specific_shocks.m	Country-specific shock comparison; descriptive robustness rather than the main common-shock test.	Country-specific LPs

File	Purpose	Primary output
LPS_real_rate_HF_formatted.m	Common shock to national ex-post real rates and the Belgium-Germany real-rate gap.	Real-rate LPs
LPS_LCI_wage_HF_formatted.m	Common shock to aggregate LCI wage growth and the cross-country wage-growth gap.	LCI wage LPs
LPS_ECB_nominal_rate_diagnostic_V1.m	Compares the timing of the ECB nominal-rate response with Belgian and German inflation responses.	ECB timing diagnostic
theta_wage_diagnostic_V1.m	Linear wage-tightness regressions and supporting time-series/scatter diagnostics.	Wage-tightness diagnostic
theta_wage_estimated_kink_threshold.m	Estimates country-specific statistical wage-tightness breakpoints by grid search.	Wage-kink estimates
theta_wage_piecewise_cutoff_robustness.m	Checks the wage-tightness kink at imposed 70th, 75th, and 80th percentile cutoffs.	Cutoff robustness
benigno_style_estimated_threshold_inflation_tightness.m	Estimates country-specific inflation-tightness breakpoints by grid search.	Inflation-kink estimates

6. Model notation and conventions

Object	Meaning
H / F	H denotes Belgium; F denotes Germany.
theta_i	Labour-market tightness deviation. In the empirical data, the tightness proxy is vacancies divided by unemployment.
theta_star_i	Country-specific model threshold at which flexible wage pressure equals the existing-wage norm.
theta_bind_i	Distance from the model threshold: theta_i - theta_star_i.
w_ex_i	Existing-wage norm.
w_flex_i	Flexible wage pressure.
w_new_i	Selected new-hire wage.
gap_i	Flexible wage minus the existing wage.
mc_i	Marginal cost.
i_ecb	Common ECB nominal policy-rate deviation.
tot / relD_HF	Terms-of-trade and relative-demand deviations in the reduced OCA closure.
gap_tol	The OccBin branch-comparison tolerance is 1e-6.
Scaling	Several model figures and tables multiply deviations by 10,000 for readability. This is a presentation transformation only.

7. Empirical data handling

The empirical scripts are designed to work with cleaned quarterly analysis files. The exact filename is not hardcoded: the user selects the appropriate CSV or Excel file when the script starts. Each script documents its required variable names in the header and validates those variables before estimation.

- The common-shock local projections standardize the shock, so responses are reported for a one-standard-deviation disturbance.
- HICP inflation and LCI wage growth are interpreted in percentage-point units as documented in the empirical appendix.
- The ex-post real rate is constructed as the common ECB nominal rate minus country inflation.
- The LCI series is an aggregate wage/labour-cost proxy and is not treated as a direct observation of the model new-hire wage.

- Estimated empirical kink thresholds are reduced-form statistical breakpoints and are not interpreted as structural estimates of the OccBin theta-star threshold.

8. Diagnostic interpretation

Mechanical pass and economic success are distinct. Residual checks establish whether the implemented equations and branch selections are satisfied numerically. The economic moments and figures then show whether the intended cross-country transmission pattern is present. A script can pass mechanically while producing a weak, absent, or reversed economic ranking.

Robustness status. The robustness screens are sensitivity exercises, not parameter tuning. Their purpose is to test whether the main mechanism survives alternative calibrations and shock environments. A Dynare or OccBin failure is recorded separately from an equation-residual failure or a change in the economic result.

9. Reproducibility and portability notes

- The submitted scripts do not require user-specific absolute paths. Model-side output folders are relative to MATLAB's current working directory.
- Run the model-side scripts from the folder containing the final .mod file, or ensure the current working directory is set appropriately.
- The robustness scripts modify temporary copies of the model text. They do not overwrite the submitted baseline .mod file.
- Empirical scripts use interactive file selection and save outputs beside the selected dataset.
- Exact figure appearance can differ if Times New Roman is unavailable, but numerical results are unaffected.
- Temporary robustness models and regenerated figures/tables are derived outputs; the core reproducibility files are the submitted code, cleaned data, and this README.

10. Minimal reproduction checklist

1. Dynare 7.0 is on the MATLAB path.
2. cleaned_reducedform_OCA.mod runs successfully.
3. The steady state is zero in deviations and the Blanchard-Kahn conditions are verified.
4. oo_occbin.simul.piecewise is available before running baseline model-side scripts.
5. Baseline model scripts generate the expected figures and tables.
6. Robustness scripts complete and export case-status tables.
7. The appropriate cleaned empirical dataset is selected for each empirical script.
8. Generated outputs match the figures and tables reported in the submitted study, subject only to formatting differences across systems.