

11_MG

QuantFit Estimator Standard Operating Procedure

SOP: Mean Group (MG)

Pesaran-Smith heterogeneous panel ARDL with no pooling

=> MG runs ARDL country-by-country, then averages the long-run coefficients.

1. Purpose

MG estimator imposes no homogeneity. Each country's ARDL is estimated independently, then the long-run coefficient vector is the simple cross-sectional average. Standard error uses the variance of the country-specific estimates.

2. When to use this estimator

Slope heterogeneity confirmed (Pesaran-Yamagata $p < 0.05$).

Hausman MG-vs-PMG rejects PMG pooling.

T per country adequate ($T \geq 25$ ideally).

3. Required data structure

Same as PMG; needs adequate per-country T.

4. Mathematical formulation

Per-country ARDL average:

λ_i estimated per country by ARDL.

$\lambda_{MG} = (1/N) \sum \lambda_i$

$SE(\lambda_{MG}) = \sqrt{(1/(N(N-1))) \sum (\lambda_i - \lambda_{MG})^2}$

5. Pre-estimation diagnostics

Slope homogeneity test (rejection motivates MG).

Per-country ARDL pre-checks.

6. Estimation procedure

Per-country ARDL with AIC lag selection.

Average the long-run coefficient vectors across countries.

Cross-sectional SE.

7. Output produced

8. Output interpretation

λ_{MG} is robust to slope heterogeneity but has wider SE than PMG.

Compare with PMG via Hausman; if pooling is rejected, MG is the consistent choice.

9. Post-estimation diagnostics

Per-country diagnostics where possible.

Cross-section dependence (Pesaran CD).

10. Common pitfalls

Sensitive to outlier countries - inspect per-country λ_i distribution.

T must be large enough per country; otherwise individual ARDLs are unreliable.

11. Reporting checklist

Per-country λ_i histogram or table.

MG average with cross-sectional SE.

Hausman vs PMG.

12. References

Pesaran, M. H., Smith, R. P. (1995). Estimating long-run relationships from dynamic heterogeneous panels.

Field | Meaning

longRunCoefficients | Cross-country average of λ_i

longRunSE | Cross-sectional SE

unitResults | Per-country ARDL output

ect | Average of country-specific ϕ_i