Results Summary

Anastasios Panagiotelis

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Four methods are used to generate base forecasts. Either base forecasts are drawn from an independent distribution or dependent distribution (all DGPs actually have dependence). Also base forecasts are Gaussian or use bootstrapping (the DGPs may be Gaussian or non-Gaussian). The following reconciliation methods are considered

- Base: Not a reconciliation method, just the base forecasts.
- BottomUp: Bottom up
- BTTH: Ben Taieb, Taylor Hyndman (2020). This is like bottom up but reorders a sample from probabilistic forecast to match the empirical copula. Also the mean is adjusted to be the same as that from MinT reconciliation.
- JPP: Jeon Panagiotelis Petropoulos (2019). This reorders a sample from the probabilistic forecast to be perfectly dependent, i.e. it reconciles quantiles. Reconciliation is done by WLS (structural)
- MinTSam: MinT with the usual sample covariance estimator
- MinTShr: MinT with shrinkage covariance estimator
- OLS: OLS reconciliation
- ScoreOptE: Energy score Optimisation by stochastic gradient descent.
- ScoreOptEIn: Energy score Optimisation by stochastic gradient descent but with predicted values (in-sample) used instead of rolling window forecasts.
- ScoreOptV: Variogram score Optimisation by stochastic gradient descent.
- ScoreOptVIn: Variogram score Optimisation by stochastic gradient descent but with predicted values (in-sample) used instead of rolling window forecasts.
- WLS: Weighted least squares using structural scaling.

Table 1: Mean score for arima modelling with a nongaussian stationary DGP

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	1.4158	1.4254	1.3850	1.3934
BottomUp	1.5054	1.5324	1.4658	1.4759
BTTH	2.7740	2.9289	2.7806	2.9414
JPP	2.8527	2.9505	2.8469	2.9432
MinTSam	1.3894	1.4056	1.3311	1.3396
MinTShr	1.3498	1.3515	1.3297	1.3385
OLS	1.3629	1.3645	1.3408	1.3505
ScoreOptE	1.3368	1.3391	1.3383	1.3408
ScoreOptEIn	1.3906	1.3873	1.3771	1.3681
ScoreOptV	NA	NA	NA	NA
ScoreOptVIn	NA	NA	NA	NA
WLS	1.3835	1.3857	1.3645	1.3743

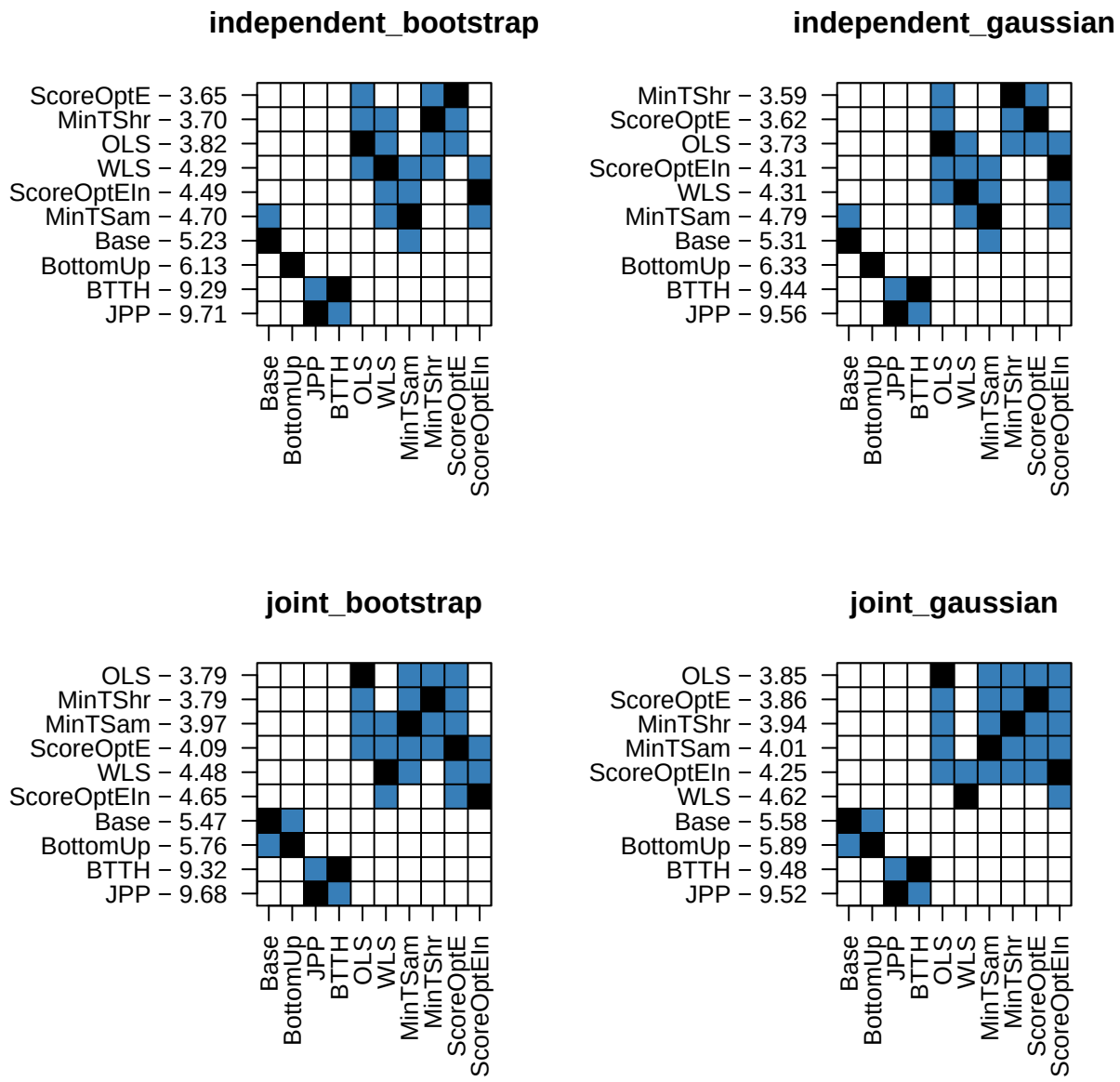

Figure 1: Nemenyi matrix for arima modelling with a nongaussian stationary DGP

Table 2: Mean score for arima modelling with a nongaussian stationary DGP

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	26.2249	26.2680	26.2416	26.2749
BottomUp	28.5899	28.8609	27.6962	27.7833
BTTH	29.1329	29.2257	29.0427	29.2276
JPP	26.3669	26.4126	26.3815	26.4184
MinTSam	26.5532	26.7430	25.5415	25.5908
MinTShr	25.4155	25.4269	25.4872	25.5377
OLS	25.6221	25.6352	25.6947	25.7490
ScoreOptE	25.6756	25.6996	25.5841	25.7010
ScoreOptEIn	25.6768	25.7269	25.5660	25.5751
ScoreOptV	NA	NA	NA	NA
ScoreOptVIn	NA	NA	NA	NA
WLS	25.9391	25.9669	26.0161	26.0801

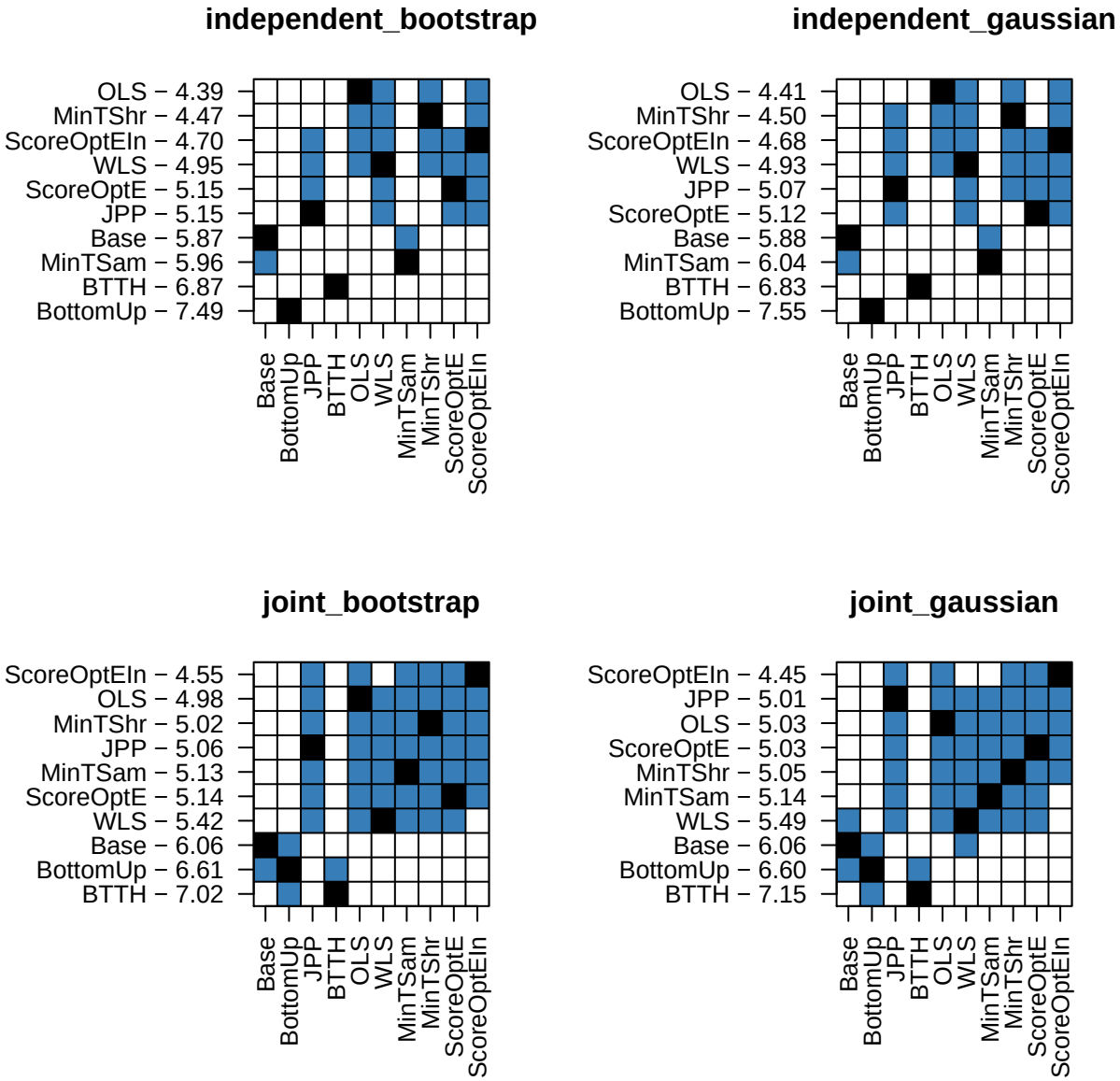

Figure 2: Nemenyi matrix for arima modelling with a nongaussian stationary DGP