

Results Summary

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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	1.4161	1.4250	1.3854	1.3910
BottomUp	1.5055	1.5312	1.4658	1.4728
BTTH	2.7647	2.9205	2.7867	2.9337
JPP	2.8793	2.9740	2.8795	2.9674
MinTSam	1.3908	1.4056	1.3315	1.3376
MinTShr	1.3505	1.3510	1.3301	1.3364
OLS	1.3635	1.3641	1.3412	1.3480
ScoreOpt	1.3383	1.3385	1.3390	1.3391
WLS	1.3839	1.3850	1.3647	1.3717

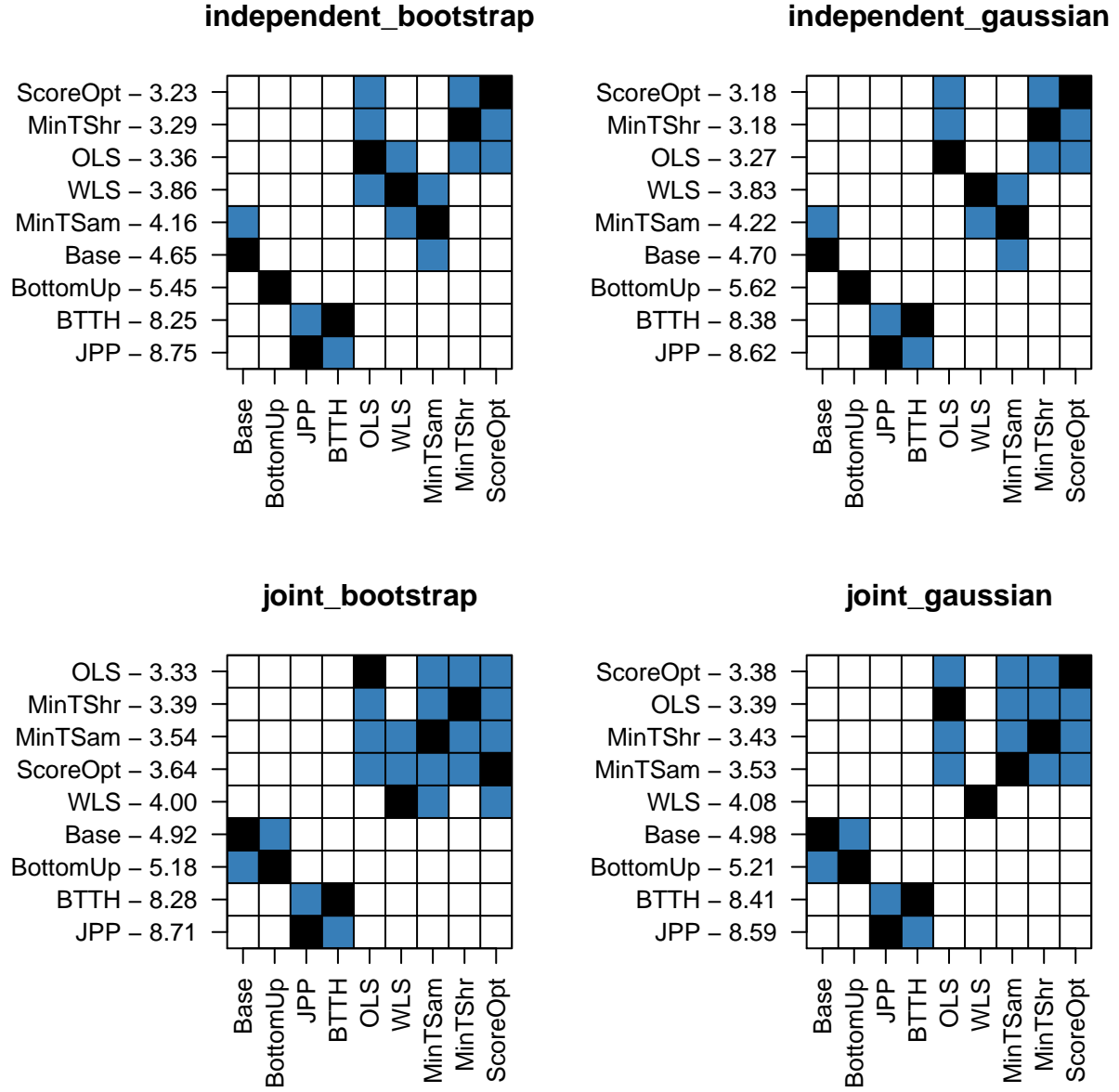


Figure 1: Nemenyi matrix for arima modelling with a nongaussian stationary DGP

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

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	26.2380	26.2639	26.2502	26.2618
BottomUp	28.5699	28.7990	27.6986	27.7585
BTTH	29.0617	29.1129	29.0845	29.1186
JPP	26.3852	26.3912	26.3968	26.3983
MinTSam	26.5825	26.7476	25.5491	25.5738
MinTShr	25.4298	25.4225	25.4942	25.5195
OLS	25.6398	25.6289	25.7015	25.7290
ScoreOpt	25.6904	25.7040	25.5899	25.6863
WLS	25.9514	25.9501	26.0217	26.0589

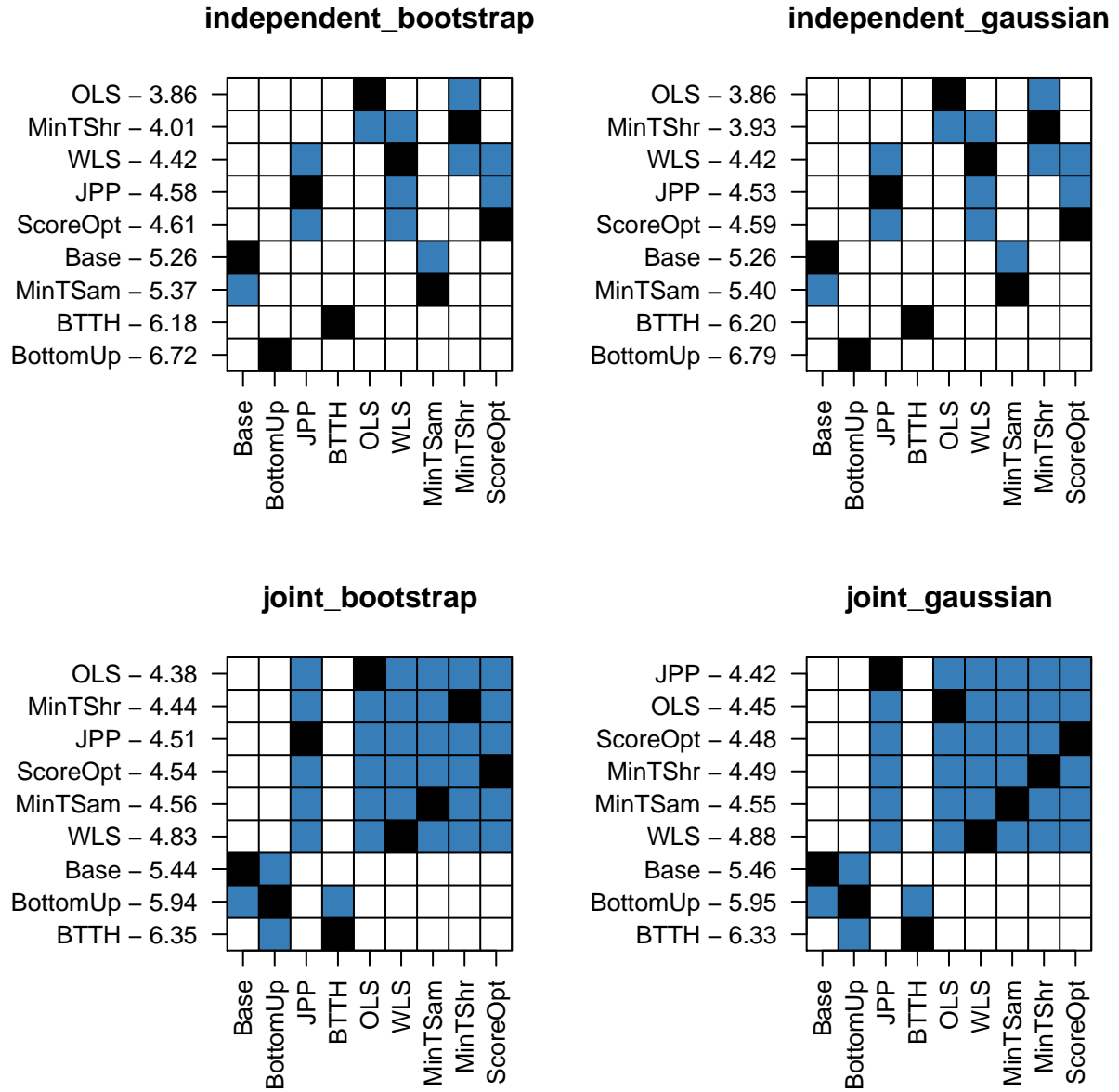


Figure 2: Nemenyi matrix for arima modelling with a nongaussian stationary DGP