Results Summary

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19 June 2020

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 ets modelling with a nongaussian stationary DGP

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	1.4344	1.4405	1.4048	1.4105
BottomUp	1.5221	1.5442	1.4854	1.4919
BTTH	2.8345	2.9977	2.8412	2.9981
JPP	2.8969	2.9997	2.8951	2.9813
MinTSam	9525.5379	10449.7109	1.3581	2.1308
MinTShr	1.3721	1.3697	1.3552	1.3620
OLS	1.3707	1.3679	1.3466	1.3535
ScoreOpt	1.3343	1.3347	1.3354	1.3356
WLS	1.3948	1.3916	1.3737	1.3806

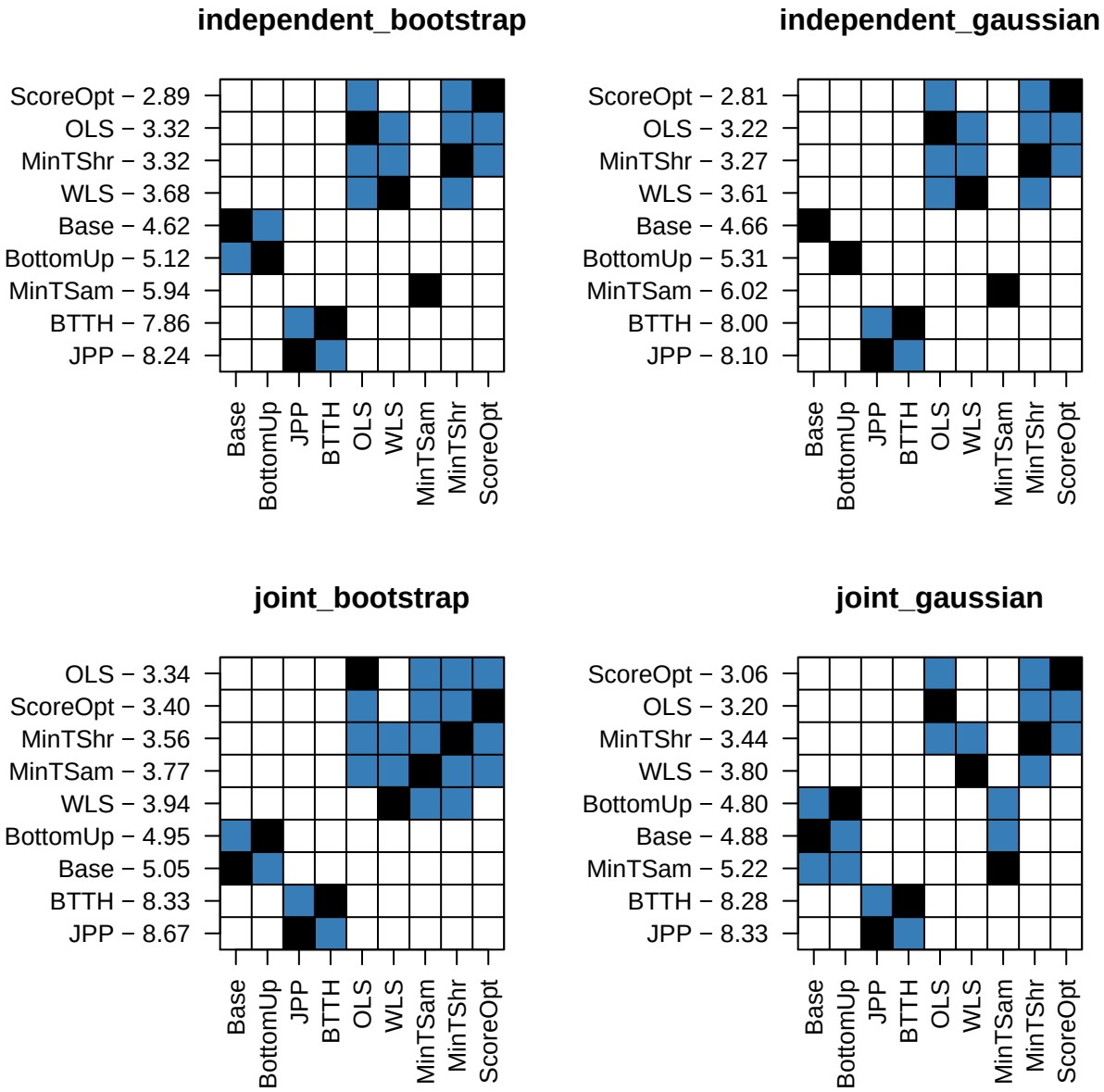

Figure 1: Nemenyi matrix for ets modelling with a nongaussian stationary DGP

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

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	2.663960e+01	2.662410e+01	26.6586	26.6465
BottomUp	2.887300e+01	2.913150e+01	28.0970	28.1370
BTTH	3.079460e+01	3.080130e+01	30.7644	30.7290
JPP	2.658980e+01	2.656150e+01	26.5970	26.5840
MinTSam	2.079841e+11	2.208128e+11	26.2326	62.9391
MinTShr	2.609370e+01	2.604940e+01	26.1894	26.1873
OLS	2.575510e+01	2.570330e+01	25.8029	25.8087
ScoreOpt	2.553760e+01	2.558000e+01	25.5034	25.5247
WLS	2.611170e+01	2.607430e+01	26.1774	26.1921

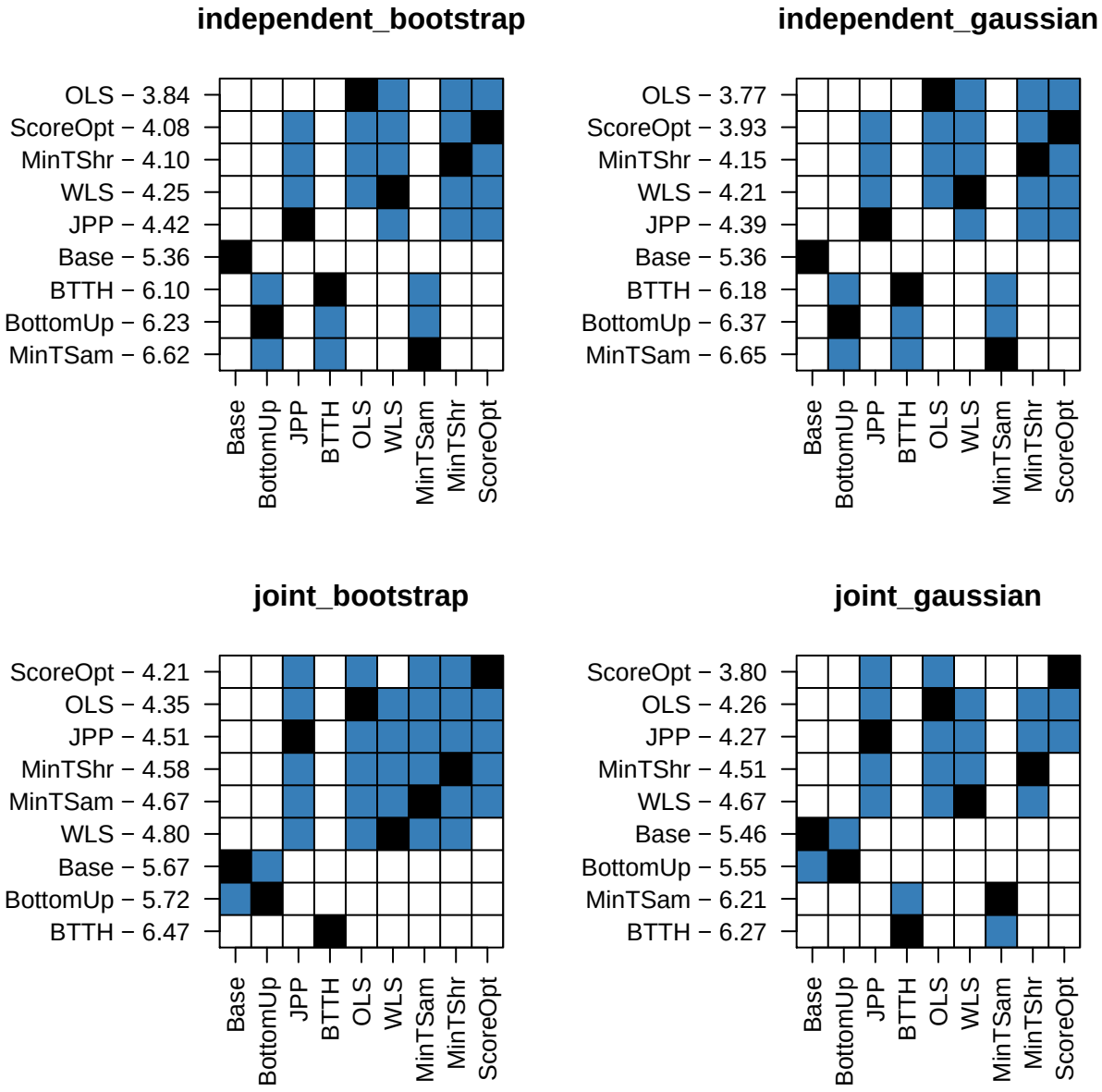

Figure 2: Nemenyi matrix for ets modelling with a nongaussian stationary DGP