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 ets modelling with a gaussian stationary DGP

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	11.8000	11.7862	11.5970	11.5780
BottomUp	12.4599	12.4454	12.2014	12.1895
BTTH	23.9431	23.9496	23.9802	23.9922
JPP	23.2219	23.2479	23.1788	23.2132
MinTSam	10.9885	10.9776	10.7943	10.7907
MinTShr	10.9451	10.9324	10.7834	10.7784
OLS	11.1782	11.1568	10.9252	10.9109
ScoreOptE	10.8261	10.8173	10.8592	10.8384
ScoreOptEIn	11.2867	11.2802	11.2036	11.2018
ScoreOptV	NA	NA	NA	NA
ScoreOptVIn	NA	NA	NA	NA
WLS	11.2184	11.1971	11.0145	10.9998

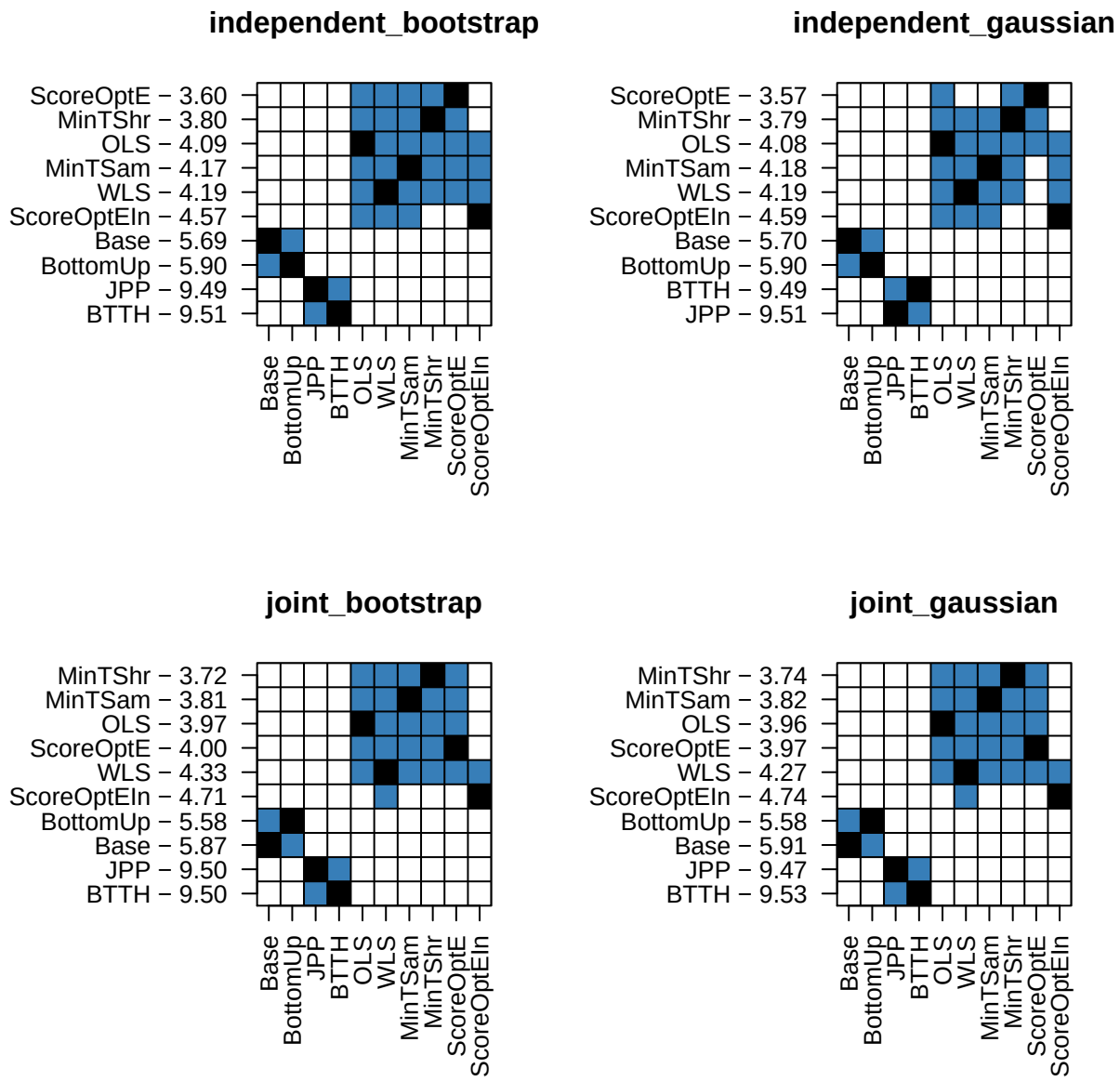

Figure 1: Nemenyi matrix for ets modelling with a gaussian stationary DGP

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

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	780.5616	781.4051	780.8606	780.6678
BottomUp	908.7998	910.7091	716.6725	716.7589
BTTH	643.0396	641.6628	643.4249	642.1115
JPP	1068.3763	1075.1956	1068.5388	1075.1950
MinTSam	731.6416	733.2323	683.7323	684.0971
MinTShr	710.8431	712.0489	683.8891	684.2481
OLS	706.1716	706.2452	691.1155	691.4302
ScoreOptE	690.2387	691.5890	686.2721	686.1524
ScoreOptEIn	783.0559	783.3572	797.5344	797.7736
ScoreOptV	NA	NA	NA	NA
ScoreOptVIn	NA	NA	NA	NA
WLS	705.6024	705.9262	688.9760	689.4802

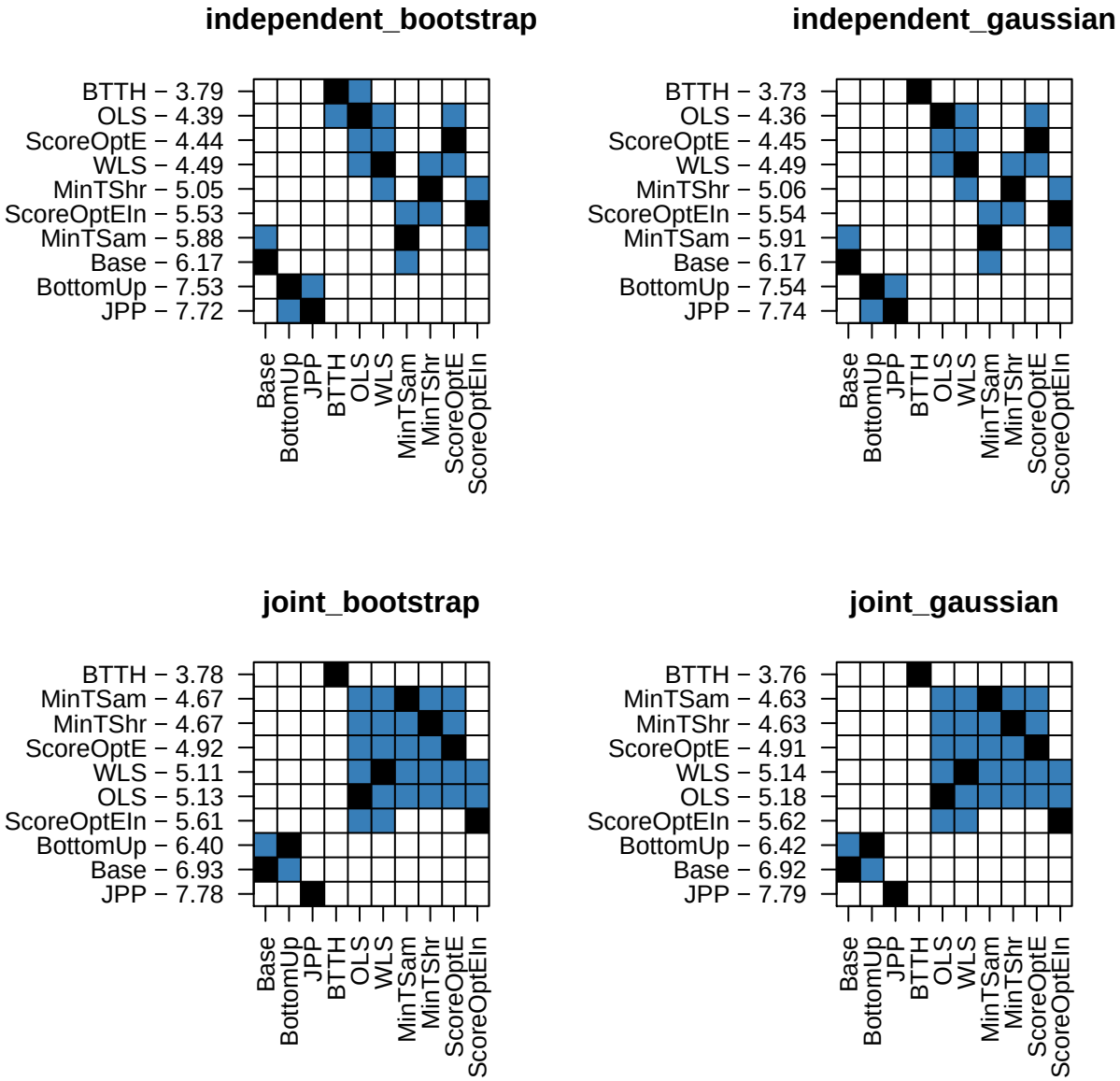

Figure 2: Nemenyi matrix for ets modelling with a gaussian stationary DGP