

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	11.8019	11.7927	11.6016	11.5891
BottomUp	12.4569	12.4548	12.2067	12.1918
BTTH	23.9076	23.9336	24.0121	24.0381
JPP	23.4051	23.4421	23.3864	23.4158
MinTSam	10.9941	10.9898	10.8024	10.7958
MinTShr	10.9495	10.9446	10.7910	10.7844
OLS	11.1776	11.1667	10.9302	10.9224
ScoreOpt	10.8344	10.8290	10.8637	10.8471
WLS	11.2169	11.2084	11.0184	11.0103

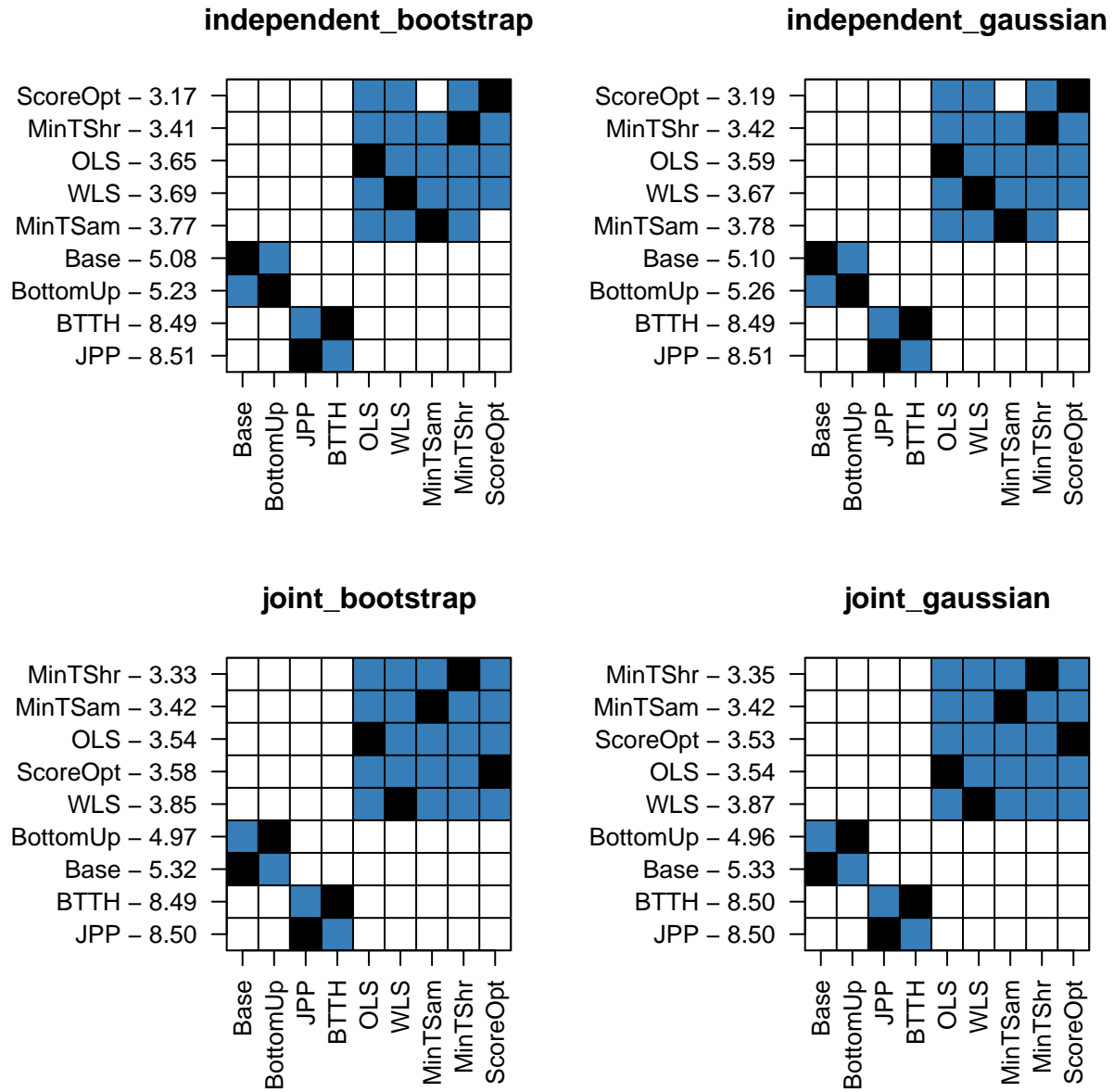


Figure 1: Nemenyi matrix for ets modelling with a gaussian stationary DGP

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

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	780.7325	781.0534	780.9808	780.6586
BottomUp	909.2612	910.5172	716.2573	716.3247
BTTH	644.5532	643.9010	642.8695	641.1855
JPP	1070.1891	1076.3834	1070.1673	1076.1660
MinTSam	731.6293	732.4352	683.8563	683.8328
MinTShr	710.8241	711.4921	683.9845	683.9890
OLS	706.4045	706.3313	690.9777	691.1397
ScoreOpt	690.2793	690.6974	686.0781	685.8587
WLS	705.8730	706.1059	688.7295	689.1167

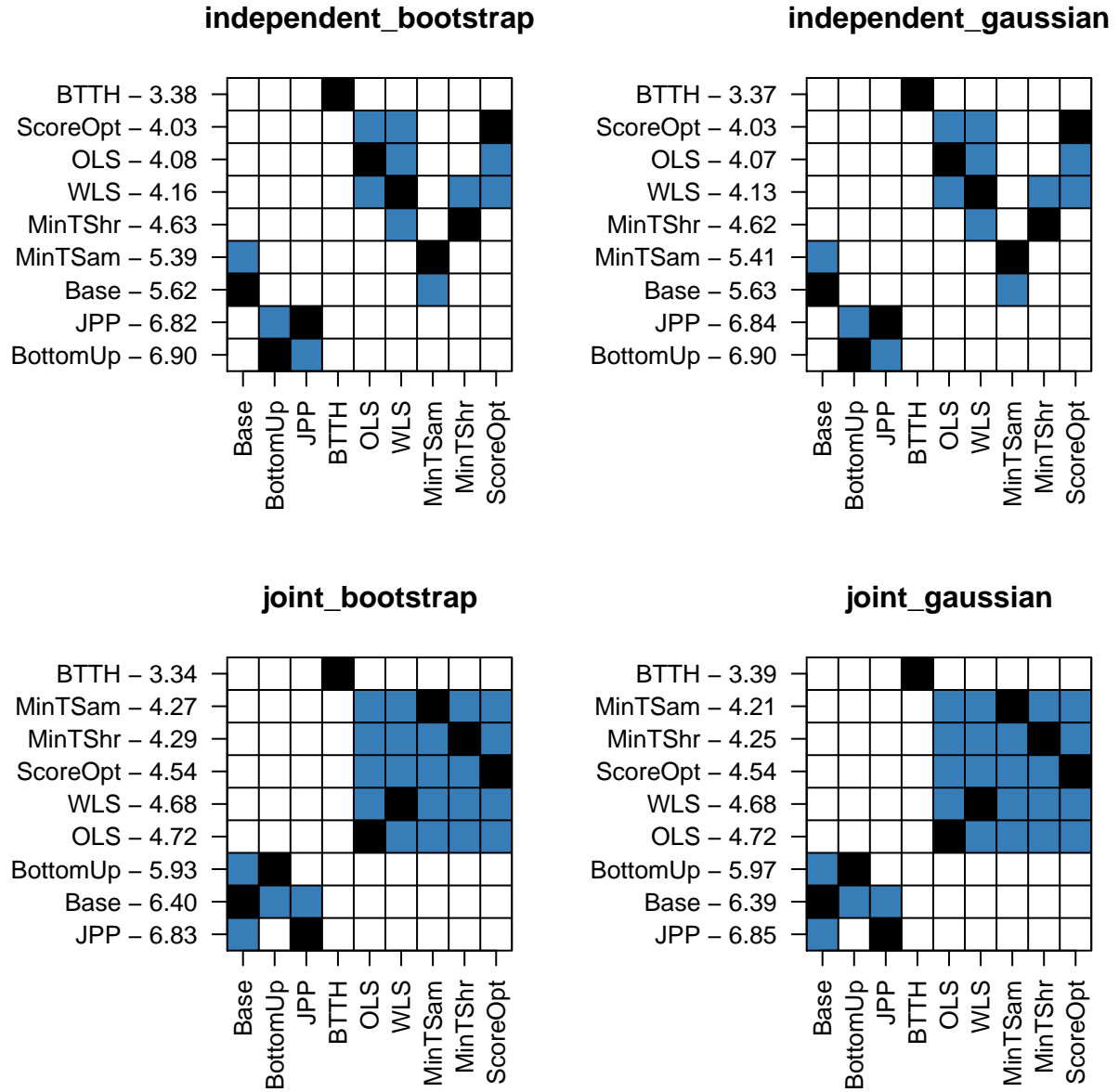


Figure 2: Nemenyi matrix for ets modelling with a gaussian stationary DGP