

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 gaussian nonstationary DGP

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	12.9297	12.9078	12.6512	12.6372
BottomUp	14.8344	14.7851	14.5738	14.5220
BTTH	26.6316	26.6309	26.7287	26.6920
JPP	26.0958	26.1032	26.0713	26.0405
MinTSam	11.7415	11.7188	11.3173	11.3036
MinTShr	11.5767	11.5521	11.3431	11.3328
OLS	12.3595	12.3339	12.0316	12.0235
ScoreOpt	11.9863	11.9738	11.8789	11.8985
WLS	12.7789	12.7490	12.5200	12.5022

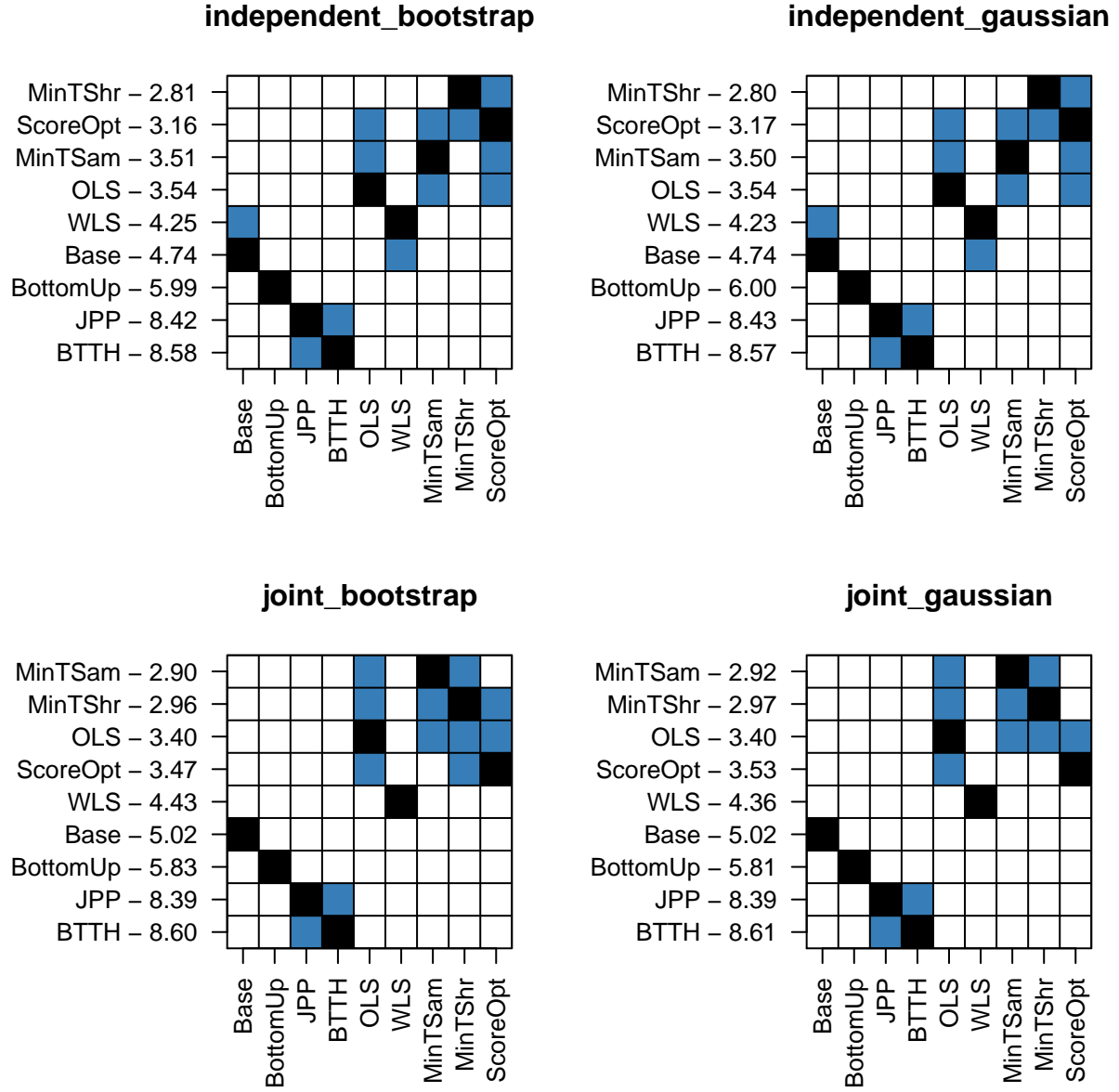


Figure 1: Nemenyi matrix for arima modelling with a gaussian nonstationary DGP

Table 2: Mean score for arima modelling with a gaussian nonstationary DGP

Method	independent_bootstrap	independent_gaussian	joint_bootstrap	joint_gaussian
Base	2189.631	2185.765	2189.720	2185.473
BottomUp	2500.710	2491.266	2480.195	2470.263
BTTH	2560.244	2551.400	2565.144	2547.727
JPP	2183.453	2177.770	2182.960	2177.721
MinTSam	1942.554	1934.737	1938.020	1931.362
MinTShr	1943.944	1937.158	1946.379	1940.584
OLS	2120.379	2115.637	2128.239	2123.899
ScoreOpt	2058.294	2056.153	2080.960	2086.547
WLS	2171.295	2165.668	2179.143	2173.687

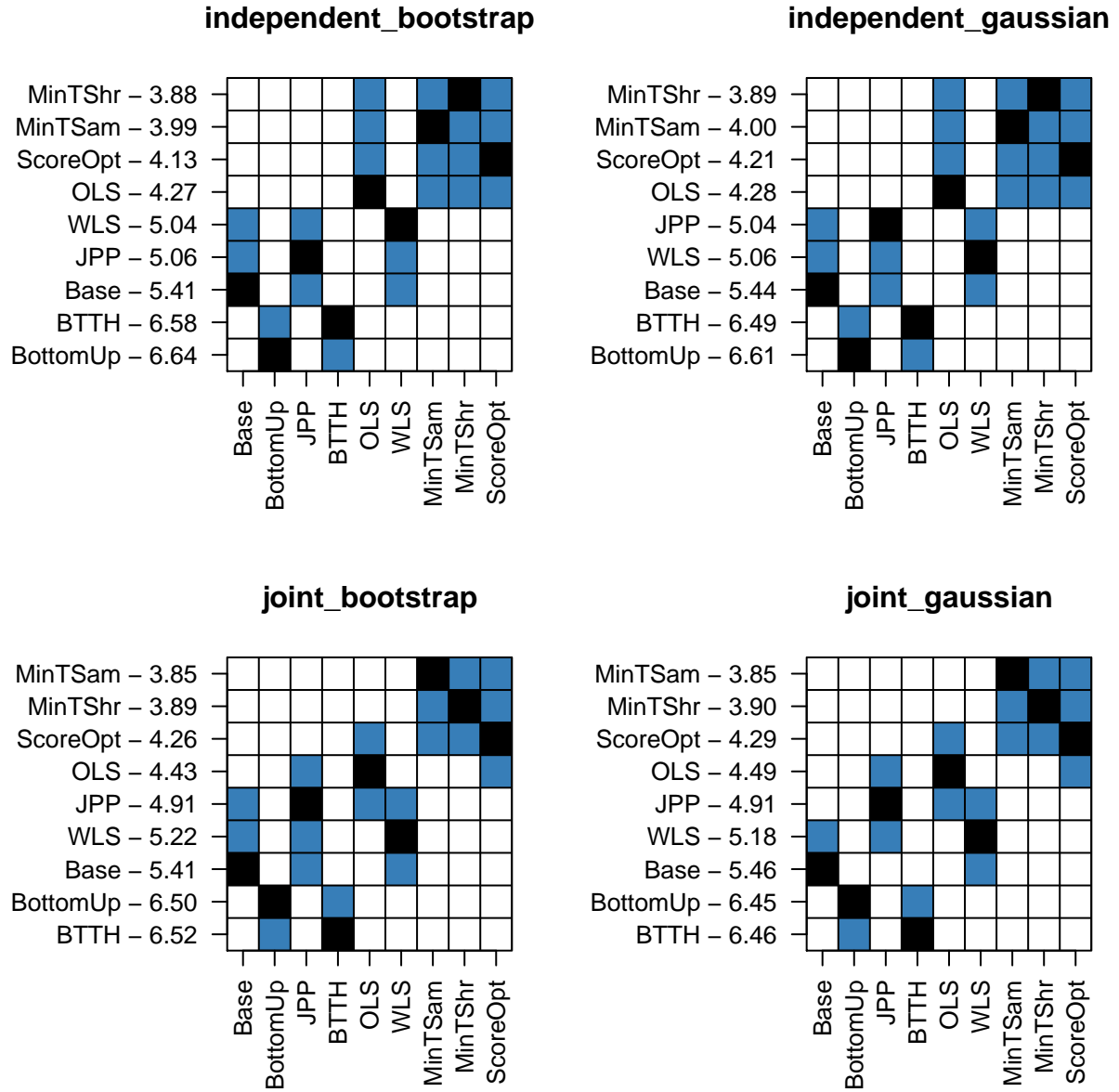


Figure 2: Nemenyi matrix for arima modelling with a gaussian nonstationary DGP