Supplement

Contents

Team scores and metadata

Model	Method	Country Targets	Affiliated Location	Forecasts	Median (IQR)	Description
epiMOX-SUIHTER	Mechanistic	Single-country	IT	134 (0.1%)	0.07 (0.03-0.15)	Metadata
MIMUW-StochSEIR	Mechanistic	Single-country	PL	76 (0.1%)	0.12 (0.06-0.25)	Metadata
UpgUmibUsi-MultiBayes	Semi-mechanistic	Single-country	IT	99 (0.1%)	0.12 (0.05-0.19)	Metadata
MOCOS-agent1	Mechanistic	Single-country	PL	386 (0.3%)	0.19 (0.11-0.31)	Metadata
Imperial-DeCa	Semi-mechanistic	Multi-country	GB	571 (0.5%)	0.19 (0.09-0.4)	Metadata
Imperial-sbkp	Semi-mechanistic	Multi-country	GB	571 (0.5%)	0.19 (0.09-0.49)	Metadata
MUNI-LaggedRegARIMA	Statistical	Multi-country	CZ	736 (0.6%)	0.19 (0.09-0.38)	Metadata
bisop-seirfilter	Mechanistic	Single-country	CZ	32 (0%)	0.2 (0.07-0.44)	Metadata
HZI-AgeExtendedSEIR	Mechanistic	Single-country	DE	382 (0.3%)	0.21 (0.12-0.31)	Metadata
itwm-dSEIR	Mechanistic	Single-country	DE	406 (0.4%)	0.21 (0.11-0.42)	Metadata
epiforecasts-EpiExpert	Qualitative	Multi-country	GB	948 (0.8%)	0.21 (0.1-0.45)	Metadata
MUNI-VAR	Statistical	Multi-country	CZ	976 (0.8%)	0.22 (0.11-0.45)	Metadata
UMass-SemiMech	Semi-mechanistic	Multi-country	Other	1904 (1.6%)	0.23 (0.12-0.52)	Metadata
ULZF-SEIRC19SI	Mechanistic	Single-country	SI	249 (0.2%)	0.24 (0.1-0.45)	Metadata
epiforecasts-EpiExpert_direct	Qualitative	Multi-country	GB	392 (0.3%)	0.24 (0.12-0.49)	Metadata
ITWW-county_repro	Semi-mechanistic	Single-country	DE	600 (0.5%)	0.24 (0.1-0.44)	Metadata
Imperial-RtI0	Semi-mechanistic	Multi-country	GB	571 (0.5%)	0.25 (0.11-0.58)	Metadata

Model	Method	Country Targets	Affiliated Location	Forecasts	Median (IQR)	Description
LeipzigIMISE-SECIR	Mechanistic	Single-country	DE	16 (0%)	0.26 (0.18-0.35)	Metadata
UMass-MechBayes	Mechanistic	Multi-country	Other	5960 (5.1%)	0.26 (0.12-0.54)	Metadata
FIAS_FZJ-Epi1Ger	Mechanistic	Single-country	DE	264 (0.2%)	0.28 (0.12-0.52)	Metadata
Karlen-pypm	Mechanistic	Multi-country	Other	3199 (2.8%)	0.28 (0.13-0.53)	Metadata
epiforecasts-EpiExpert_Rt	Qualitative	Multi-country	GB	404 (0.3%)	0.28 (0.11-0.58)	Metadata
ILM-EKF	Semi-mechanistic	Multi-country	DE	12013 (10.4%)	0.29 (0.19-0.5)	Metadata
MIT_CovidAnalytics-DELPHI	Mechanistic	Single-country	Other	500 (0.4%)	0.3 (0.16-0.52)	Metadata
epiforecasts-EpiNow2	Semi-mechanistic	Multi-country	GB	7744 (6.7%)	0.3 (0.16-0.61)	Metadata
USC-SIkJalpha	Mechanistic	Multi-country	Other	12731 (11%)	0.31 (0.13-0.61)	Metadata
SDSC_ISG-TrendModel	Statistical	Multi-country	CH	1755 (1.5%)	0.31 (0.16-0.66)	Metadata
ICM-agentModel	Mechanistic	Single-country	PL	334 (0.3%)	0.33 (0.15-0.57)	Metadata
LANL-GrowthRate	Semi-mechanistic	Multi-country	Other	3708 (3.2%)	0.33 (0.12-0.73)	Metadata
bisop-seirfilterlite	Mechanistic	Multi-country	CZ	336 (0.3%)	0.34 (0.2-0.55)	Metadata
IEM_Health-CovidProject	Mechanistic	Multi-country	Other	7720 (6.7%)	0.34 (0.17-0.66)	Metadata
UNED-PreCoV2	Statistical	Single-country	ES	147 (0.1%)	0.35 (0.26-0.66)	Metadata
MUNI-ARIMA	Statistical	Multi-country	CZ	11369 (9.8%)	0.37 (0.18-0.69)	Metadata
RobertWalraven-ESG	Statistical	Multi-country	Other	10488 (9%)	0.39 (0.18-0.72)	Metadata
UB-BSLCoV	Statistical	Single-country	ES	96 (0.1%)	0.44 (0.31-0.72)	Metadata
EuroCOVIDhub-baseline	Statistical	Multi-country	GB	13096 (11.3%)	0.49 (0.23-0.85)	Metadata
MUNI_DMS-SEIAR	Mechanistic	Single-country	CZ	212 (0.2%)	0.58 (0.33-0.91)	Metadata
prolix-euclidean	Semi-mechanistic	Multi-country	FR	800 (0.7%)	0.63 (0.24-1.4)	Metadata
JBUD-HMXK	Mechanistic	Multi-country	AT	1324 (1.1%)	0.68 (0.34-1.2)	Metadata

Model fitting

Code is available at: https://github.com/epiforecasts/model-structure-evaluation.

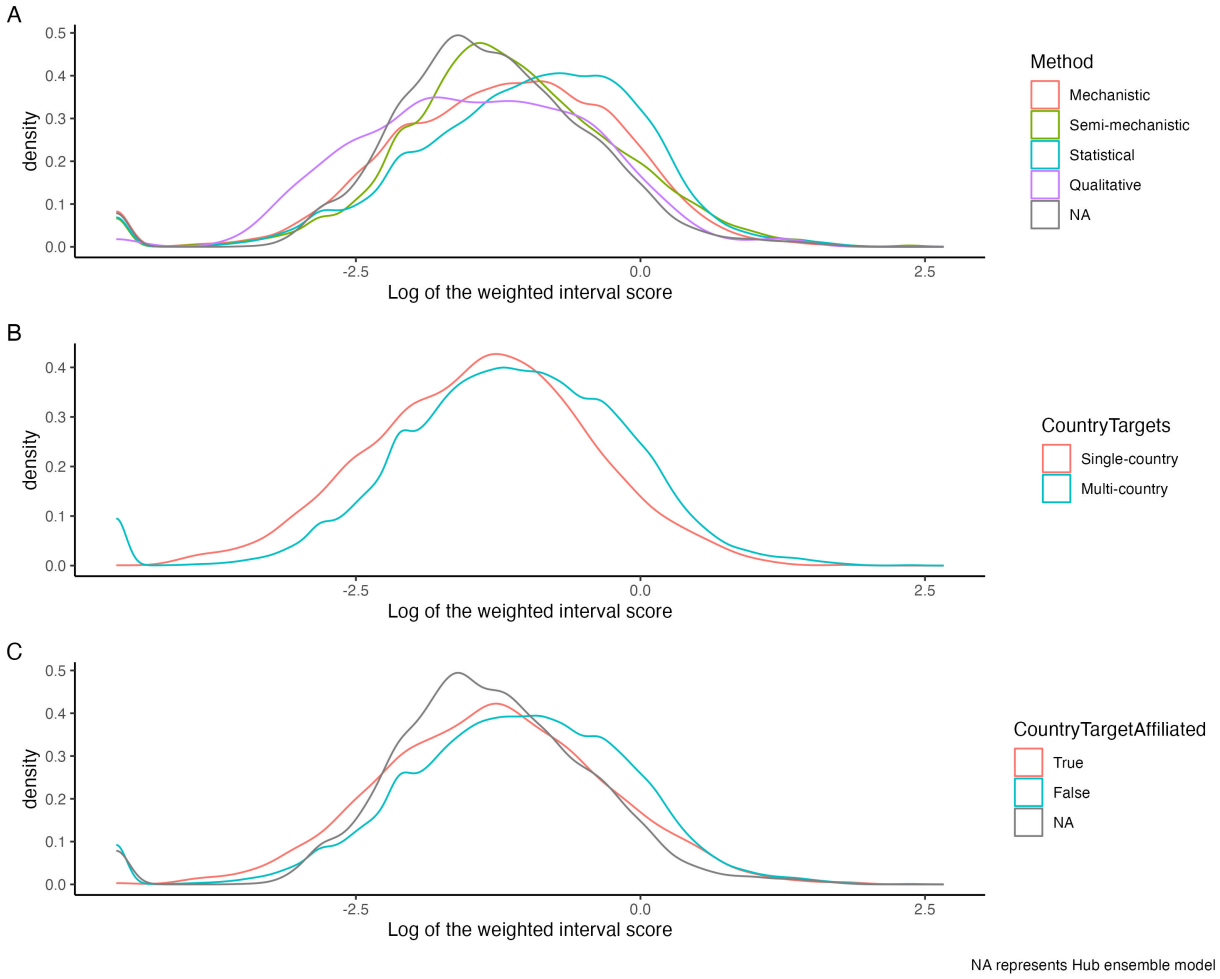

Figure 1: Density plot

1. Conditional distribution of outcomes

2. Model formula ~, log_interval_score, Method + CountryTargets + CountryTargetAffiliated + s(Incidence) + Trend + Horizon + s(Model, bs = "re")

3. Summary of estimates Reference levels for categorical variables are: - Mechanistic model method - Single-country target - Modelling team affiliation is located in the forecast target country - Trend (of observed incidence) is stable - Horizon is one-week-ahead

Component	**Term**	**Estimate**	**Std Error**	**t-value**
A. parametric coefficients	(Intercept)	-1.716	0.101	-16.974
	MethodSemi-mechanistic	0.050	0.160	0.313
	MethodStatistical	0.213	0.168	1.266
	CountryTargetsMulti-country	0.267	0.141	1.894
	CountryTargetAffiliatedFalse	-0.186	0.023	-8.121
	TrendIncreasing	0.624	0.008	73.486
	TrendDecreasing	0.538	0.008	65.730
	Horizon.L	0.544	0.006	89.825
	Horizon.Q	-0.036	0.006	-5.995
	Horizon.C	0.006	0.006	1.018
Component	**Term**	**edf**	**Ref. df**	**F-value**
B. smooth terms	s(Incidence)	8.105	8.775	311.182
	s(Model)	31.047	32.000	108.074

Signif. codes: 0 <= '***' < 0.001 < '**' < 0

Adjusted R-squared: 0.176, Deviance explained 0.176

-REML : 137926.677, Scale est: 0.892, N: 101181

Table 3: ANOVA for parametric terms

	df	F	p-value
Method	2	0.834	0.434
CountryTargets	1	3.586	0.058
CountryTargetAffiliated	1	65.955	0.000
Trend	2	2943.461	0.000
Horizon	3	2705.213	0.000

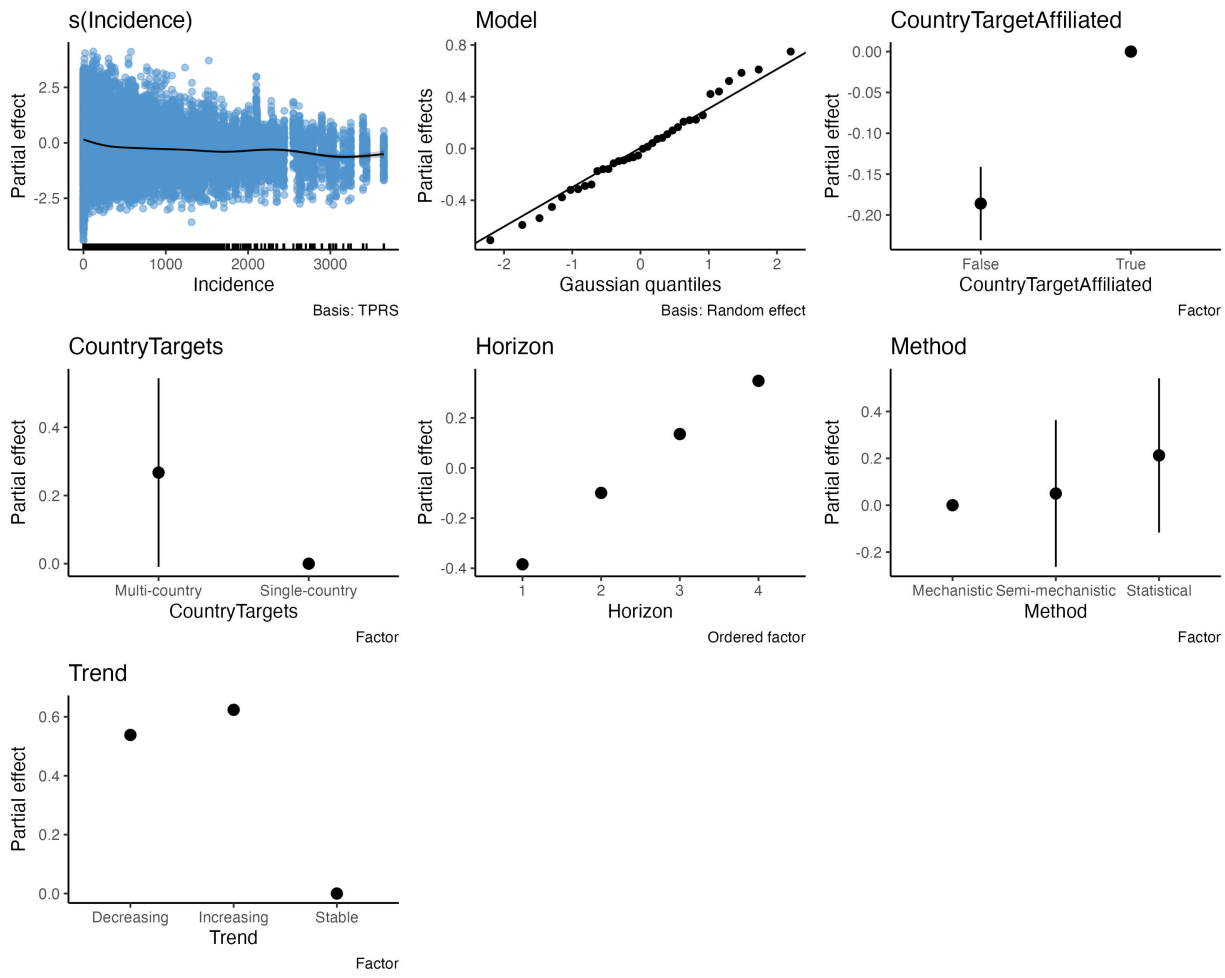

Figure 2: Model estimates

4. Partial effects plots

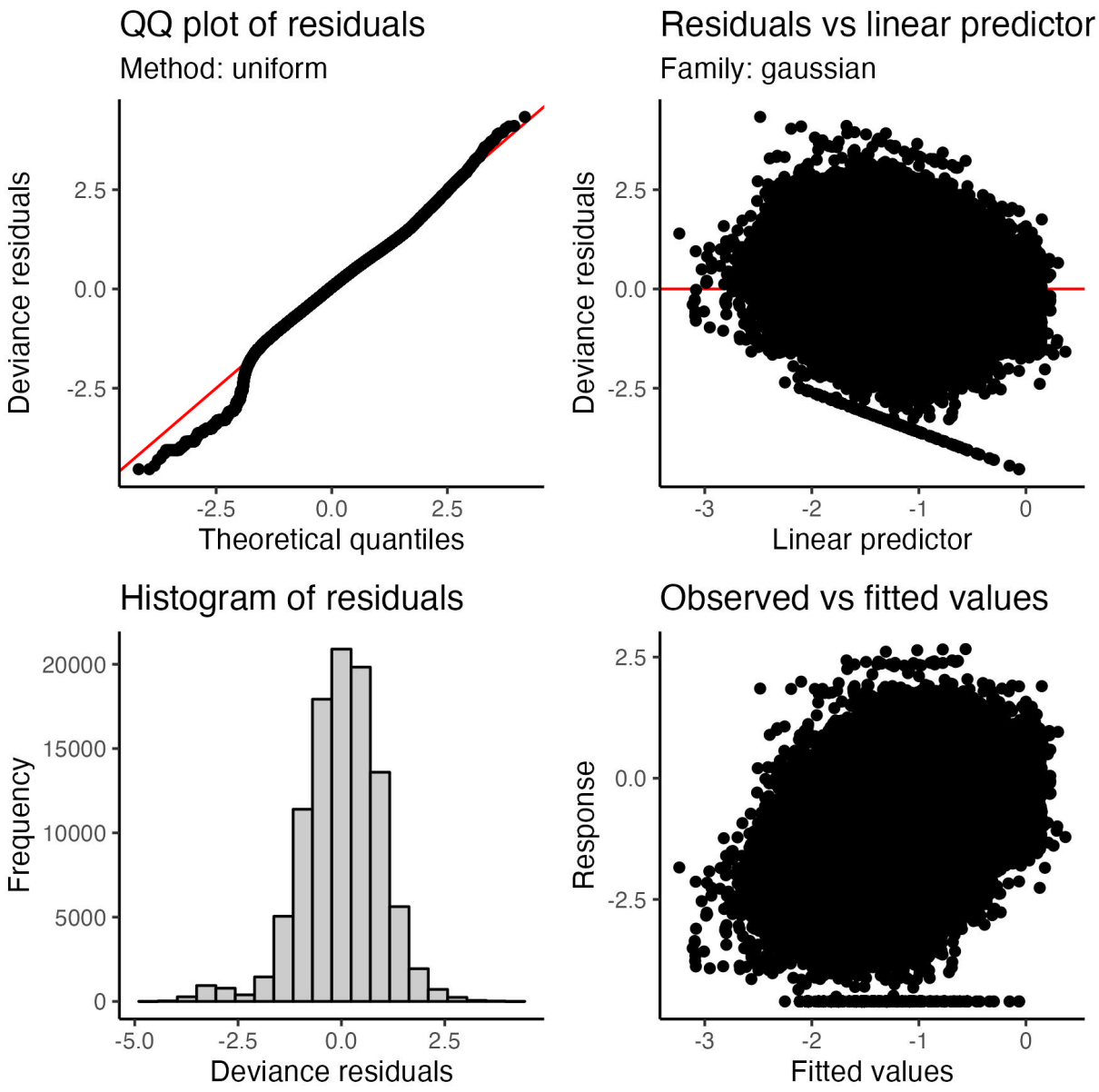

Figure 3: Diagnostics

5. Model diagnostics