

# INDEX

- Approximate Bayesian Computation (ABC), 107
- Augmented Dickey-Fuller (ADF) procedure, 5
- Autoregressive models with exogenous variables (ARX) conditional forecasts, 40–41, 50–52 factor model (FM) approach, 17, 20, 32
- Black, Asian and minority ethnic (BAME) groups, 132
- Business intelligence, 98–99
- Census Household Pulse Survey, 128
- Chicago Fed National Financial Conditions Index (NFCI), 73–74
- Common mental disorder (CMD), 126
- Comovement, financial markets asymmetric correlations, 77 extreme value theory (EVT), 78–79 linear setting, 76 principal components analysis, 79–80
- Computable General Equilibrium (CGE) models consumption patterns, 59 demand- and supply-side shocks, 62–63 demand-side effects, 60 economic impact, 59 input-output models, 57–58 labour market, 61–62 labour productivity, 62 macroeconomic analysis, 57–58 neo-Keynesian model, 64 parameters re-calibration, 60 SAM-multiplier models, 64 structural change, 58 taxonomy of, 65–66, 68 time-dependent, 58–59 Walrasian frameworks, 58 web-based communication services, 59
- World Trade Organisation (WTO), 62–63
- Conditional forecasts, 53–55 autoregressive models with exogenous variables (ARX), 40–41, 50–52 downside scenario, 40–41, 44, 47 exogenous variables, 30–31 gross domestic product (GDP), 24, 28, 30, 32 intermediate pandemic scenario, 28, 30, 40–42, 45, 48 macroeconomic variables, 24, 27, 29, 31 pandemic scenario, 28, 30 unemployment rate, 24, 28, 30, 32 upside pandemic scenario, 28, 40–41, 43, 46, 49
- Contact-tracing strategy, 113
- Covariance matrix, 15
- COVID-19 Government Response Tracker, 7
- Cross-sectional asset pricing, financial markets empirical analysis, 80 linear setting, 76
- Cyber security, 101–102
- Data privacy, 101–102
- Differences-in-differences (DiD) analysis, 137
- Digital economy advantages, 96–97 AI-based technologies, 101

- consumer behaviour, 97–98
- cyber security, 101–102
- data privacy, 101–102
- decision-making process, 98
- digital businesses, 95–96
- digital demand, 97–98
- digital globalisation, 99–100
- digital supply and productivity, 98–99
- ethical concerns, 101
- global disruption, 96
- industrial revolution, 101
- market structure, 100–101
- product selection, 98
- remote work policies, 100–101
- risk assessment strategies, 101–102
- social activities, 95–96
- social distancing policies, 100–101
- World Health Organisation (WHO), 95–96
- Digital globalisation, 99–100
- Distributed Lag Model, 108
- Econometric models, 75
  - factor models, 6–7
  - vector autoregressive model with exogenous variables (VARX), 7–8
- Empirical analysis, financial markets
  - comovement, 77–80
  - cross-sectional asset pricing, 80
  - out-of-sample forecasting, 81–82
- Epidemic models. *See* Uncertainty estimation, Italy
- Ethnic inequality, United Kingdom
  - digital services, 155
  - Minority Ethnic Groups (MEGs). *See also* Minority Ethnic Groups (MEGs), 144
  - UK-Biobank and UK Labour Force Survey (UKLFS), 144
  - UK Household Longitudinal Study (UKHLS), 144
  - vaccination campaign, 152–155
- European Centre for Disease Prevention and Control (ECDC), 3
- Extreme value theory (EVT), 78–79
- Factor model (FM) approach
  - 2008-crisis samples, 9–10
  - augmented Dickey-Fuller (ADF) procedure, 5
  - autoregressive models with exogenous variables (ARX), 17, 20, 32
  - ‘business as usual’ recovery strategies, 1–2
  - conditional forecasts. *See also* Conditional forecasts, 24
  - covariance matrix, 15
  - econometric modelling, 6–8
  - eigenvalue gaps over time, 16
  - eigenvalues distribution, 9, 12, 15
  - European Centre for Disease Prevention and Control (ECDC), 3
  - forecasting error bands, 18–21
  - Gershgorin’s circles, 15–17, 36–37
  - labour market, 2
  - macroeconomic variables, 3–5
  - Oxford COVID-19 Government Response Tracker (OxCGRT), 5
  - post-COVID-19, 2
  - public expenditure index (PE). *See also* Public expenditure index (PE), 21
  - rolling window estimation approach, 8–9, 38–40
  - Root Mean Square Error (RMSE), 17–18, 20, 22
  - sequential factor estimation, 9, 11–12, 14
  - socio-economic resilience, 1–2
  - tracking error (TE), 8–9, 17
  - US and EU economies, 2–3
  - US employment, 9, 11
  - variance, 9, 11–14, 36, 38

- Financial markets
  - and COVID-19 pandemic, 72–73
  - economic indicators, 71–72, 74
  - empirical analysis, 77–82
  - empirical literature, 72, 74–75
  - linear setting, 76–77
  - nonlinear dynamics, 75–76
  - time series, 72
- Forecasting error bands, 18–21
- Gender inequality, 130
- General Anxiety Disorder 7-item scale (GAD-7), 137
- 12-item General Health Questionnaire (GHQ), 135–136, 146
- Gershgorin’s circles, 15–17, 36–37
  - rolling window size, 38, 40
- Gross Domestic Product (GDP), 3, 17
  - conditional forecasts, 24, 28, 30, 32
  - seismology, United States, 86–87, 90–91
- Hamer–Kermack–McKendrick–Soper (SIR) model, 105–106
  - applications, 106
  - contact-tracing strategy, 113
  - differential equations, 107
  - Distributed Lag Model, 108
  - Hospitalized, Intensive Care, and Deaths, 107
  - Irish Health Information Quality Authority, 112
  - Istituto Superiore di Sanita, 112–113
  - model parameters, 110
  - Nelder–Mead optimizer algorithm, 111
  - pandemic data, 110–111
  - parameter estimation, 111
  - recovery rate, 108
  - regressive-autoregressive time series model, 108
  - SIHCRD model, 108–111, 114
  - Susceptible, Infected, and Recovered, 107
  - transmission rate, 108
- Harmonised Index of Consumer Prices (HICP), 9
- Impact of Event Scale (IES)
  - indicators, 136–137
- Incorporated Research Institutions for Seismology (IRIS)
  - database, 87–88
- Irish Health Information Quality Authority, 112
- Italian National Healthcare System, 160–161
- Labour market, 61–62, 134
- Labour productivity, 62
- Linear setting, financial markets
  - comovement, 76
  - cross-sectional asset pricing, 76
  - limitations, 77
  - out-of-sample forecasting, 76–77
- Lombardy healthcare system
  - clinical manager, 169
  - data source, 162
  - emergency management, 161
  - geographic regression-discontinuity design, 166
  - hospital-based assistance, 164
  - infection rates, 160
  - intensive care units (ICU), 162–163
  - Italian National Healthcare System, 160–161
  - mortality, 163–164, 167
  - national and international realities, 162
  - national lockdown, 160
  - organisational structure, 162
  - pandemic emergency, 169–170
  - patient-centric care, 166–167
  - quality assessment, 170
  - quality of cares, non-COVID patients, 167–168
  - quantitative evidence, 161–162

- regional pandemic management system, 166
- regional policies, 165–166
- risk perception, 159
- sociodemographic indicators, 161
- spatial autoregressive (SAR) model, 165
- MEGs. *See* Minority Ethnic Groups (MEGs)
- Mental health
  - 12-item General Health Questionnaire (GHQ), 135–136
  - anxiety symptoms, 127–128
  - Black, Asian and minority ethnic (BAME) groups, 132
  - ‘business-as-usual’ policy, 128
  - Census Household Pulse Survey, 128
  - common mental disorder (CMD), 126
  - costs, 131–132
  - counselling demand, 126–127
  - COVID-19 effect, 118, 120, 125
  - demographic dimensions, 129–132
  - differences-in-differences (DiD) analysis, 137
  - domestic violence, 131–132
  - face-to-face survey, 133
  - General Anxiety Disorder 7-item scale (GAD-7), 137
  - Impact of Event Scale (IES) indicators, 136–137
  - labour market, 134
  - lockdown and social distance, 118
  - non-pharmaceutical strategies, 117–118
  - policy responses, 133
  - pre-COVID-19 baseline data, 135
  - psychological distress, 127–128
  - remote learning, 134
  - risk factors, 128–129
  - Shapley- Shorrocks decomposition, 138
  - social media, 119
  - UK Household Longitudinal Study (UKHLS), 135–136
- Minority Ethnic Groups (MEGs)
  - alcohol consumption, 147
  - Black minorities, 145, 147–148
  - COVID-19 outcomes, 148–150
  - empirical evidence, 151
  - employment rate, 144–145
  - labour market, 151–152
  - lockdown restrictions, 145
  - mental health and well-being, 146–147
  - self-employment, 145
  - social mobility, 152
  - sociodemographic and health factors, 150
  - socioeconomic heterogeneities, 145–146
  - total registered hospital death, 148–149
  - UK Biobank data, 150–151
- Nelder–Mead optimizer algorithm, 111
- Out-of-sample forecasting, financial markets
  - empirical analysis, 81–82
  - linear setting, 76–77
- Oxford COVID-19 Government Response Tracker (OxCGRT), 5
- Personal Consumption Expenditure (PCE) index, 3
- Principal components analysis, 79–80
- Probability Density Function (PDF), 88–89
- Public expenditure index (PE)
  - downside scenario, 21–22
  - growth factor, 23
  - historical data and variables level, 23–24
  - intermediate scenario, 21–22
  - monthly growth, 23–24
  - pandemic scenarios, 21–22

- unemployment rate, 24
- upside scenario, 21–22
- Quality of cares, non-COVID patients, 167–168
- Regional pandemic management system, 166
- Regressive-autoregressive time series model, 108
- Rolling window estimation approach, 8–9, 38–40
- Root Mean Square Error (RMSE), 17–18, 20, 22
- Seismology, United States
  - Corona economic crisis, 87
  - economic analysis, 85–86
  - economic indicators, 85–86
  - fixed effects panel data estimation, 90–91
  - Gross Domestic Product (GDP), 86–87, 90–91
  - human-induced ground vibrations, 88–89
  - Incorporated Research Institutions for Seismology (IRIS) database, 87–88
  - macroeconomic analysis, 91–92
  - Probability Density Function (PDF), 88–89
  - seismic noise, 86–87
  - seismic sensors, 86–87
  - seismic stations, 87–88
  - vibration index (VI), 86–87, 89–90
- Sequential factor estimation, 9, 11–12, 14
- Shapley-Shorrocks decomposition, 138
- Small and Medium Enterprises (SMEs), 100
- Social distancing policies, 100–101
- Social dysfunction, 130
- S&P 500 index, 72–73
- Spatial autoregressive (SAR) model, 165
- Spatio-temporal models, 105–106
- Spedali Civili, 168
- Stock market, 75
- Susceptible, Infected, Hospitalized, Intensive Care, Recovered and Deaths (SIHCRD) model, 108–111, 114
- Tracking error (TE), 17
  - factor model (FM) approach, 8–9, 17
- UK-Biobank and UK Labour Force Survey (UKLFS), 144
- UK Household Longitudinal Study (UKHLS), 135–136, 144, 146–147, 151–152
- Uncertainty estimation, Italy
  - Approximate Bayesian Computation (ABC), 107
  - convenience sampling, 106
  - COVID-19 diffusion, 110–112
  - Hamer–Kermack–McKendrick–Soper model, 105–106
  - single discrete-time equation, 107
  - spatio-temporal models, 105–106
  - stochastic epidemic models. *See* Hamer–Kermack–McKendrick–Soper (SIR) model
- Unemployment rate, 3, 9, 17
  - conditional forecasts, 24, 28, 30, 32
- US Department of Health and Human Services, 72–73
- Vaccination campaign
  - first dose, 153
  - pre-existent health conditions, 154
  - second dose, 153–154
  - socioeconomic inequality, 152
  - survey data, 154–155
- Variance, 9, 11–14, 36, 38
  - rolling window size, 38–39

- Vector autoregressive model with  
exogenous variables  
(VARX), 2–3, 7–8, 35–36
- Vibration index (VI), 86–87, 89–90
- Vix index, 73–74
- Web-based communication services,  
59
- World Health Organisation (WHO),  
73, 95–96
- World Trade Organisation (WTO),  
62–63