

# INDEX

- ACAC Arab multilateral agreement, 91–92
- Air cargo, 183–184, 185
  - basic cargo operators
    - market strategy, 189
    - network strategy, 189–190
    - product strategy, 189
    - stake-holder objectives, 190
  - as by-product of passenger transport, 168
  - cargo-only airlines, 169
  - Cargo Stars, 196–197
    - market strategy, 196
    - network strategy, 196–197
    - product strategy, 196
    - stakeholders' objectives, 197
  - 'Carpet Sellers' cluster group, 187–189
    - market strategy, 188
    - network strategy, 188
    - product strategy, 187–188
  - global air cargo industry, 168
  - intangible resources in, 173
  - large passenger wide-body operators, 193–194
    - market strategy, 193–194
    - network strategy, 194
    - product strategy, 193
    - stake-holder objectives, 194
  - 'Low Cost Low Yielder' clusters, 191–193
    - market strategy, 192
    - network strategy, 192
    - product strategy, 192
    - stake-holder objectives, 192–193
  - market strategy, 171–173
    - capacity management, 171–172
    - determining geographical markets, 172
    - global distribution systems (GDS), 172–173
    - spot available capacity, 171–172
    - use of E-portals, 172–173
  - network strategy, 173–174
    - alliances, 174
    - cargo schedules on passenger aircraft, 173–174
    - decisions for development, 173–174
    - integrators, role of, 174
    - route network development, 173–174
    - unit cost of operations, 173
  - premium cargo operators, 194–196
    - market strategy, 195
    - network strategy, 195
    - product strategy, 194–195
    - stake-holders' objectives, 195–196
  - service of Emirates, 191–192
  - stakeholders' objectives, 189
  - strategic management in, 169
    - AF-KLM Cargo, 170
    - cargo alliances, 170–171
    - Emirates Sky Cargo, 170
    - IAG<sup>3</sup> Cargo, 170
    - Lufthansa Cargo, 170
    - product strategy, 169–171
    - yield management, 170

- strategy content framework
  - cluster analysis, 179–181
  - cluster centers, 180
  - clustering process, 181, 182
  - data set, 176
  - key components, 175, 176
  - k-means Cluster Analysis, 179–181
  - methodology and approach, 179–181
  - numeric indicators, 176–179
- strong regionals
  - market strategy, 190–191
  - network strategy, 191
  - product strategy, 190
  - stake-holder objectives, 191
- tangible resources in, 173
- typology and characteristics of
  - cluster groups, 186
- variable costs in, 168
- Air China, 190
- Aircraft emissions, 29–30
  - challenges in reducing, 30–31
  - trade-off between CO<sub>2</sub> and NO<sub>x</sub>, 30
- Aircraft noise, EU regulations, 29
  - See also* Time-differentiated airport noise surcharges
- Aircraft with geared turbofan (GTF)
  - engines, economic evaluation of, 6
- Air France, 193, 196–197
- Air France-KLM, 197
- Airline alliances, 11–13, 118
  - cargo alliances, 170–171
  - cooperation agreements, types of, 123–124
    - full alliances, 124
    - independent firms, 123
    - joint venture, 124
    - joint venture with full revenue sharing, 124
  - mergers, 124
  - soft alliances, 123
- cross-equity partnerships, 118, 123
- impact of, 118
- on interhub markets, 118
- joint ventures, 118
  - Air France/KLM, 118, 127
  - Alitalia, 118
  - Delta/Northwest, 118
  - effects of, 118–119, 124–125
  - equations, 128
  - in interhub markets, 127, 128
  - in interline markets, 127–128
  - routing, 127–128
  - in transatlantic market, 127
- literature review, 119–120
- negative effects of, 12–13
- non-stop routing (interhub markets), 118
- one-stopover routing (interline markets), 118
- Oneworld, 118
- SkyTeam, 118
- standard alliances, 118
- Star Alliance, 118
- theoretical model, 120–125
  - data and sample, 126–128
  - deeper cost-sharing agreements, 122
  - effect of joint ventures, 124–125
  - empirical application of effect of joint ventures, 126–130
  - estimation and results, 128–130
  - interhub and interline markets, 120–121, 128–130
  - operating cost on a route, 121–122
  - presence and intensity of cost sharing, 122
  - revenues, 121
  - 2-airline-2-hub network, 120–121
  - unified model of cooperation agreements, 122–124
- vertical and horizontal alliances, 171

- Airline service providers,
  - categorization of, 2–3
- Airline total factor productivity,
  - study, 92
- decompositions of TFP, 102–103
- efficiency change index, 101
- methodology, 92–95
  - computation, 92–93
  - efficiency change, 92–93
  - production technology,
    - defined, 94
  - scale economies changes (SEC),
    - 93–94
  - technical change (TC), 92–93
- panel dataset, 95–97
- stochastic frontier analysis, 97–101
- TFP change index, 101
  - after financial crisis, 2008,
    - 103–104
  - Asian economic crisis, effect of,
    - 103–104
  - averages of efficiency change (EC) and technical change (TC), 104, 105
  - Iraqi invasion of Kuwait, effect of, 103–104
  - low cost carriers, 103
  - post September 11th, 2001
    - attack, 103–104
  - strategic alliances, 103
  - yearly changes in average,
    - 103–104
- Air Namibia, 205
- Airport Charges Directive, 19
- Airport night curfews, 230,
  - 232–233, 236
- Airport noise charges, 230, 232–233
- Air services agreements (ASA), 19
- Air traffic flow management (ATFM), 31
- Air transport sustainability, 28
- American Airlines, 194
- A320neo aircraft, benefits of, 6, 212,
  - 214–217
- Barroso Commission, 10, 26, 31
- Basic cargo operators
  - market strategy, 189
  - network strategy, 189–190
  - product strategy, 189
  - stake-holder objectives, 190
- Birman Bangladesh Airlines, 205
- British Airways, 50, 196–197, 205,
  - 210, 212
- Brussels Airlines, 187
  - pricing campaign, 3–4
    - battle between Vueling, Ryanair and Brussels Airlines, case study, 81–87
- Brussels Airport, 3–4
- Business Aviation (BA), 138–144
  - Booz Allen Hamilton and German Aerospace Center (DLR)
    - study on, 143–144
  - defined, 138–140
  - previous studies and research on,
    - 140–143
  - regional connectivity benefits,
    - 160–163
    - in air ambulances and medical evacuations, 162
    - average time savings, 161–162
    - time savings between regions of different economic power,
      - 162–163
    - for WingX, 161
  - structure and macroeconomic impact of, 144–156
    - direct effects, 144
    - direct GVA effects, 153–154
    - employment, 144, 147, 153
    - gross value added (GVA), 144
    - indirect, induced and total effects, 154–156
    - indirect effects, 144
    - induced effects, 144, 155
    - total employment and GVA effects, 156, 157
  - travel time and productivity
    - benefits of, 156–160, 164
    - average trip durations, 159

- data and methodology, 158–159
  - productive work time, impact on, 160
  - time spent on ground, 159–160
- Business aviation-related direct employment, 153
- with business aircraft operators, 145–147
- with fixed-wing aircraft operators, 146
- in ground handling and FBO segments, 150, 151
- with helicopter and fixed-wing operators, 146, 147, 148
- in maintenance, repair and overhaul of business aircraft (MRO), 148–150
- in operations and manufacture by European country, 152–153
- CAL Cargo Airlines, 188
- Carbon neutral growth, 30
- Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), 39–40
- Cargo airports, 191–192
- Cargo demand, 172
- Cargo Stars, 196–197
  - market strategy, 196
  - network strategy, 196–197
  - product strategy, 196
  - stakeholders' objectives, 197
- 'Carpet Sellers' cluster group, 187–189
  - market strategy, 188
  - network strategy, 188
  - product strategy, 187–188
- Cathay Pacific Airways, 194, 195
- Charter of Passenger Rights*, 21
- China Southern Airlines, 190
- Clean Air Act, 50
- CO<sub>2</sub> emissions, 212–213, 214
- Competition among European airlines, 11–15, 78
  - battle between Vueling, Ryanair and Brussels Airlines, case study, 81–87
  - market deregulation and liberalization, impact of, 78–79
  - pricing strategies, 78–80
    - defining ceiling, 79
    - differential pricing model, 79, 80
    - economic pricing systems, 79
    - influencing variables, 78
    - maximum capacity utilization, 79
    - pricing as tactical instrument, 81
    - 'unbundling' principle, 80
    - and yields and profits, 80–81
- Computer reservation systems (CRS), 15
- Connecting traffic, 58, 65–66
- Contemporary air travel in Europe, 1
- Cross-equity partnerships, 118, 123
- Data Envelopment Analysis (DEA), 4
- Delta Airlines, 196–197
- Deregulation of airline industry, 4–5
  - European context, 1–2
- Directive on Airport Charges, 18–19
- Easyjet
  - "Worldwide by EasyJet" program, 62–63
- Economies of traffic density, 118–119, 122, 129
- Efficiency measures of airlines, 92
- EFTA states, 144
- El Al Israel Airlines, 189
- Emirates
  - market strategy, 192
  - network strategy, 192
  - product strategy, 192
  - stakeholder objectives, 192–193

- Emissions Trading Scheme (ETS), 2, 30, 34–35
  - phases of, 45–46
- Environmental impact, 212–213
- Ethiopian Airlines, 187, 189
- Etihad Airways, 193–194
- EU27 CO<sub>2</sub> emissions, 27
- Eurocontrol, establishing, 31–32
- European airlines, productivity of, 2
- European Air Traffic Management Network (EATMN), 32
- European air transport policy
  - Airport Charges Directive, 19
  - liberalizing associated services, 15–21
    - airport charges, 18–19
    - Airport Package* of 2011, 21
    - airport slot allocation, 17–18
    - ground handling, 16–17
    - hub competition, 19–20
    - impact of LCCs on regional airport competition, 16
    - operating restrictions, 20
    - Regulation (EU) No 598/2014, 20
    - state aid cases and regulation, 19
  - liberal market approach, 10–22
    - adjust fares on intra-EU cross border routes, 10–11
    - airline ticket advertising, 14–15
    - alliances, 11–13
    - Aviation Guidelines, 13, 14
    - block exemptions, 11
    - carry passengers to and from any other Member State, 10–11
    - Code of Conduct for Computer Reservation Systems, 15
    - competition law framework, 11–15
    - computer reservation systems (CRS), 15
    - de minimis* regulation, 13
    - freedom to set airfares, 10–11
    - increase capacity, 10–11
    - market economy investor principle, 13–14
    - market economy operator principle, 13
    - mergers and acquisitions (M&A), 11–13
    - rescue and restructuring guidelines, 13
    - resolution on state aid modernization, 13–14
    - ruling on agreement between Brussels South Charleroi Airport and Ryanair, 13
    - subsidies to airlines, 13–14
  - passenger rights regulation (PRR), 21–22
    - amendments, 22
    - delays and rights to compensation, 21–22
    - Passenger Rights Proposal (PRP), 22
    - Regulation EC261/2004, 21
    - Regulation EC300/2008, 23
    - Regulation EC550/2004, 33
    - Regulation EC1008/2008, 38
    - Regulation EC2320/2002, 23
    - Regulation (EU) No 598/2014, 20
    - See also* Greening of air transport
- European Aviation Safety Agency (EASA), 24, 26
- European Aviation Safety Management System (EASMS), 24–25
  - actions for, 24–25
  - occurrence reporting, 25
  - Proposal for Regulation by European Parliament and Council, 25–26
- European Aviation Safety Plan (EASP), 24, 26
- European Organization for the Safety of Air Navigation (EUROCONTROL), 49
- European Union (EU), 10, 14–15, 23
- Eurowings, 60
- EU28 states, 144

- External aviation policy,
  - 34–40
  - application of ETS, 39–40
  - application of ETS to extra-EU flights, 39–40
  - Common Aviation Area (CAA), 38–39
  - emergence of, 35
  - future challenges, 43–44
  - legal certainty of air services
    - agreements, 35–36
  - liberalizing inter-regional air transport, 36–39
  - Open Aviation Area (OAA)
    - agreement, 37–38
- External policy, 2
- Fortaleza agreement, 91–92
- Freedoms of the air, 46
- Full service network carriers (FSNCs), 57–58, 60, 61, 62
- Garuda Indonesia, 189
- Geared Turbo Fan (GTF) engines, 202
  - cost-benefit analysis (CBA), 203
  - fuel savings, 202
  - impact of, 203, 217, 218
- Global air cargo industry, 168
  - See also* Air cargo
- Global Distribution Systems (GDSs), 15, 118
- Global financial crisis, 2008, 4
- Global market based measure (GMBM), 39
- Greenhouse gas (GHG) emissions, 28, 29–30
  - commitment to reduce, 26, 27
  - Directive 2003/87/EC and, 45–46
- Greening of air transport, 2, 26–34
  - addressed by Barroso Commission, 26
  - aircraft efficiency, 28
  - air transport sustainability, 28
  - challenges in reducing emissions, 30–31
    - ACARE vision, 31
    - EU's Vision 2020, 31
  - CO<sub>2</sub><sup>56</sup> emissions per available seat kilometer (ASK), 29–30
  - commitment to reduce GHG
    - emissions, 26, 27
  - future challenges, 41–43
  - regulations on noise, 29
  - research programs, 27
  - short- or medium-term carbon-free solutions, 26–27
  - Single European Sky (SES), 31–34
    - attempt at ATM
      - harmonization, 32–33
    - cost of delays, 33
    - establishing Eurocontrol, 31–33
    - functional airspace blocks (FAB), 33–34
    - implementation of, 32, 33, 34
    - legislative framework, 32
    - schedule padding, 33
    - technological progress, 28–29
    - Vision 2020*, 28–29, 30, 31
- Ground Handling Directive, 16–17
- Gulf Air, 188, 189
- Hub competition, 19–20
  - Gulf carriers vs European airlines, 19, 20
- Input-Output Analysis, 5, 142–143
- Interhub markets, 118, 119, 127, 128
- Interline markets, 118, 119, 120, 127–128
- International Civil Aviation Organization (ICAO), 19, 20
  - carbon neutral growth, 39
  - Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), 39–40

- Jade Cargo Airlines, 170–171
- Joint ventures, in transatlantic market, 117–119, 127
  - Air France/KLM, 118, 127
  - Alitalia, 118
  - Delta/Northwest, 118
  - effects of, 118–119, 124–125
  - equations, 128
  - in interhub markets, 127, 128
  - in interline markets, 127–128
  - routings, 127–128
- KLM, 193–194
- Korean Air, 189, 190
- Large passenger wide-body operators, 193–194
  - market strategy, 193–194
  - network strategy, 194
  - product strategy, 193
  - stake-holder objectives, 194
- Legacy carriers, 79
- Liberalization, 2
  - future challenges, 40–41
  - liberalizing associated services, 15–21
  - liberal market approach, 10–22
    - equal access to resources, 40
- London Heathrow (LHR)–Frankfurt (FRA) route, 6, 203–208
  - charges imposed, 214
  - cost-benefit analysis (CBA) for, 203, 208–214
    - aircraft appraisal model, 209–210
    - aircraft selection appraisal, 214–218
    - available seat kilometres (ASKs), 203, 205, 207–208, 210, 212–213
    - calculation of number of aircraft required on, 208
    - direct operating costs, 212
    - efficiency cash flow, 208
    - exchange rates, 206, 212
    - indirect operating costs, 212
    - key variables and assumptions, 210–214
    - long-term capacity forecast: 2017–2027, 205–206
    - number of aircraft, 206–208
    - private cash flow, 208
    - project cash flow, 208
    - referent group cash flow, 209
    - traffic review (2000–2016), 204–205
  - emissions and LTO charges per airport, 213
  - noise aircraft category per airport, 213
- Low-cost carriers (LCCs), 2–3, 57–58
  - codesharing, 61–63
  - establishment of foreign bases, 62
  - features, 47
  - growth and evolution of European, 59–60
    - changes in business model of European, 59, 60
    - connection-building, 60
    - introduction of long-haul services, 60
  - hub-and-spoke network
    - configurations, 2–3, 57–58, 59, 63–66, 73–74
    - comparison of HS network and mesh network, 65
  - offline connections between airlines, 61
  - online connections, 58–59, 61–63
  - point-to-point services, 2–3, 57–58, 63–64
  - regional airport competition, impact of, 16
  - self-connecting, 61–63
  - short-haul, 58, 62
  - See also* Ryanair

- 'Low Cost Low Yielder' clusters, 191–193
  - market strategy, 192
  - network strategy, 192
  - product strategy, 192
  - stake-holder objectives, 192–193
- Lufthansa, 196–197
  - hubs operated by, 62
  - long-haul services, 62
- Malmquist Index, 4
- Malmquist TFP index, 92–93
- Market economy operator
  - principle, 13
- Marketing strategies, 5–6
  - cluster analysis, 5–6
- Mergers and acquisitions (M&A), in
  - Europe, 11–13
    - Aegean/Olympic Air, 11–12
    - Air France/KLM, 11–12
    - benefits to passengers, 12–13
    - British Airways/Iberia (IAG), 11–12
    - case of acquisition of Aer Lingus by Ryanair, 12
    - negative effects of, 12–13
    - Swissair and Sabena, 11–12
    - United Airlines/Continental, 11–12
    - U.S. Airways/American Airlines, 11–12
- Mesh networks, implications of, 63–64, 65, 66, 67
  - benefits, 66
  - provision of online connecting services, 65–66
- Metal-neutral joint ventures, 118
- NetJets, 146
- Network topology, 59, 63–65
- 9/11 terrorist attacks, 2001, 4
- Nippon Cargo Airlines, 187
- Noise Directive, 29
- Noise emission, 213, 230
  - pricing, 231
- Noise operating restrictions, 20
- Non-integrated airlines, 169
- Non-stop routings (interhub markets), 118
- NOx emissions, 48
- One-stopover routings (interline markets), 118
- Oneworld, 4–5, 127
- Open Aviation Area (OAA)
  - agreement, 19, 37–38
- "Open Sky" agreements, 91–92
- Open sky ruling, 50
- Passenger rights regulation (PRR), 21–22
  - amendments, 22
  - right to accurate, timely and accessible information, 21
  - right to assistance, 21
  - right to compensation, 21
    - delays and, 21–22
  - right to price transparency, 21
  - right to reimbursement, 21
- Passenger rights regulation (PRR), 21–22
  - amendments, 22
  - delayed flights, right to compensation for, 21
  - delays and rights to compensation, 21–22
    - Regulation EC261/2004*, 21
    - Sturgeon case, 21, 22
  - Passenger Rights Proposal (PRP), 22
- Philippine Airlines, 189
- Polar Air Cargo, 187, 188
- Predatory pricing, 172
- Premium cargo operators, 194–196
  - market strategy, 195
  - network strategy, 195
  - product strategy, 194–195
  - stake-holders' objectives, 195–196
- Price discrimination, 79



- Pricing strategy, 3–4, 77
  - Brussels Airlines' pricing campaign, 3–4
- Principles of good governance, 24
- Product Composition Differentiation index (PCD-index), 187, 198
- Product differentiation, 79, 80
  - and cargo yield management, 170
- Qantas, 189, 190
- Qatar Airways, 194, 195
- Regional connectivity benefits, 160–163
- Revenue Management Systems, 170, 171–172, 195, 196
- Royal Jordanian, 205
- Ryanair (FR), 2–3, 58–59, 62–63, 73
  - battle between Vueling, Ryanair and Brussels Airlines, case study, 81–87
  - connections via Porto (OPO), case study, 59, 66–73
    - bookable online connections, 69
    - branded fares, 71, 72
    - connecting flights via OPO, 68–69
    - connections via OPO, 70
    - fares for connecting flights via Porto, 72
    - inbound and outbound FR flights in OPO, 71
    - route network, 71
    - schedule of arrival and departing flights in OPO, 72
  - mesh network of, 67
- Safety and security, 2, 22–26
  - aviation security under EU's regulatory, 23–24
  - beyond safety regulation, 26
  - certification of air traffic management (ATM), 26
  - European Aviation Safety Management System (EASMS), 24–25
  - European Aviation Safety Plan (EASP), 24
  - future challenges, 41
  - occurrence reporting, 25
  - Regulation EC300/2008, 23
  - security costs, 23
  - security effectiveness, 24
  - X-ray body scanners, 23–24
- SARS outbreak, 2004, 4
- Saudia, 189
- Self-connecting, 61
- 7<sup>th</sup> Framework Programme 2007–2013, 48
- Singapore Airlines, 193–194
- Single European Sky (SES), 31–34
- SkyTeam, 4–5, 101, 127
- Smart growth, 46
- Star Alliance, 4–5, 101, 118, 127, 170–171
- State aid regulation, 19
  - Leipzig Halle Case, 19
- Sustainable growth, 46
  - EU2020 approach to, 46
- Sustainability, 28, 242
- Thai Airways, 190
- Time-differentiated airport noise
  - surcharges, 230, 232–233
  - airline rationales and, 237–239
  - airport noise externalities, 235–236
  - framework, 237
  - impact of noise emissions, 235
  - network planning view, 238
  - night curfews and, 236
  - noise externality quantification, 235
  - policy goals, 230, 231
  - pricing scheme, 234
  - resource allocation view, 238–239

- scheduling perspective,
  - 239–240, 241
- single, independent flight view,
  - 237
- steering effects of, 239–241
- sustainability, 242
- tactical effects, 240, 242
- technological incentives and,
  - 240–241
- theory, 230
- Total factor productivity. *See* Airline
  - total factor productivity,
    - study
- Turkish Airlines, 194, 195
- Umbrella merger model, 43
- United Airlines, 196–197
- US Airline Deregulation Act of 1978, 4
- Volga Dnepr, 187, 198
- Vueling, 60
  - battle between Vueling, Ryanair and Brussels Airlines, case study, 81–87
- Wizz Air, 60
- WOW Cargo Alliance, 170–171