

Index

- Alexander, Douglas 57, 128–30
Altshuler, A. and D. Luberoﬀ 365
Anderson, D. and H. Mohring 362, 366–7, 375
area licensing
 London *see* London Congestion Charging Scheme
 United States 6–7, 10, 319
Armeliu, H. and L. Hultkrantz 362–3
Arnott, R. and K.A. Small 23
Atkinson, R.W. 199
Austria
 DSRC (dedicated short range communication) system 245
 HGV kilometre-based charging 245–6, 248
 HGV onboard devices (Go-Boxes) 245, 248
 infrastructure costs 237, 239, 240
 motorway tolling 245–6
 TRIPON-Box 248
 user acceptance 248
automatic number plate recognition (ANPR)
 licence plate bans 201
 London 184
 London Congestion Charging Scheme (LCCS) 2, 161, 170–71
 Stockholm Trial 294–5
 see also electronic road pricing (ERP)
Bae, Chang-Hee Christine 1–20, 69, 313–26
Balmer, U. 244, 245, 247, 248
Banister, David 176–97, 220–21, 222
Bardach, E. 275
Bassok, Alon 313–26
Baum, D. 363
Beesley, M.E. 23
Beevers, S.D. and D.C. Carlaw 178
Belgium
 Brussels study on Traffic congestion and environmental issues 199–200
 vignette licence 234
Bell, Michael G.H. 23–38
Bendixon, Terence 39–56
Bergen 280, 283–4, 285
Bertrand, J. 24, 28, 29
Bishop, R. 28
Blair, Tony 42, 127, 128–9
Bloomberg, Mayor Michael 7, 8
Blow, L. and I. Crawford 69
Boiteux report, Paris 268
Borins, S. 282, 366
Bowman, B. 213
Bröcker, J. 99
Brundell-Freij, Karin 293–309
Burris, M.W. 95
bus services
 bus deregulation, Edinburgh 282
 bus fuels, London 185
 guided bus network, Cambridge 105, 107, 112–14
 improvement and London Congestion Charging Scheme (LCCS) 201, 212, 218, 270
 Inland Breeze, San Diego County, California 371–2
 and London LEZ 184, 185, 190
 Paris 254, 255, 256, 258, 259–60, 263, 267, 268–9, 270
 Stockholm Trial 302
 UK 23, 131–2, 186, 219
 see also public transport
Byers, Stephen 120, 126
Calfée, J. and C. Winston 362
California 287, 289, 317, 318, 339–40, 368
 bridge tolls 343
 California Bill 680 (1989) 286

- FasTrak corridor, San Diego County 370–72
- Los Angeles 223, 225, 330, 331, 332, 339, 344, 345, 362, 368
- Los Angeles County freeway pricing 372–5
- Los Angeles County freeway pricing, cost-benefit analysis 373–5, 376
- Orange County 8, 343
- San Diego County 370–72
- San Diego County, Inland Breeze bus service 371–2
- San Francisco 7, 319, 330, 331, 332, 371, 377
- California SR91, Southern California 8, 286, 288, 342–56
 - cost-benefit analysis 349–52, 353–4
 - data inputs 347–8
 - express lanes 342–3, 349–52
 - highway network effects 349–55
 - household relocation effects 348–9
 - model results of hypothetical expansion 348–55
- Orange County Transportation Authority (OCTA) ownership transfer 343
- political uncertainty 352
- pricing strategy 343, 349–52
- solo driving 350, 351
- Southern California Planning Model (SCPM) 343–7, 349, 352, 355
- toll times 349
- traffic volume 343
- transponders 343
- value pricing 343, 352
- Cambridge
 - A14 transport corridor 105, 107
 - Cambridge Futures and congestion charging effects 98–117
 - car fuel consumption 113
 - car travel 113, 114, 280–81
 - CHUMMS study 107
 - combined option 107–8, 115, 116
 - commuter traffic 106, 108, 110
 - congestion charging 107–8, 111, 112, 113, 114, 115, 149, 152, 279–81, 285
 - congestion charging, reasons for non-implementation 10, 279–80
 - congestion charging, reconsideration of 280–81
 - cost of living 109–10, 111, 114, 115, 116
 - cycling and walking 114
 - emission rates, predicted 110, 111
 - employment growth 109–10, 111, 112, 113, 115–16
 - environmental issues 110, 111, 114, 115
 - guided bus network 105, 107, 112–14
 - land use transport model 99–104
 - land-use comparison between 2016 ‘Reference case’ and 2001 ‘Base Case’ 109–10, 115
 - Mott Report 98
 - park-and-ride 107, 108, 114
 - public transport 105, 107, 108, 110, 112–14, 115, 280–81
 - Regional Planning Guidance 98
 - revenue redistribution 114, 115, 280
 - road building (orbital highway) 107, 108, 110, 112, 113, 114–15, 116
 - Structure Plan 2016 105–6, 107, 110, 112
 - technology, suggested 279–80
 - traffic delays 112–13
 - transport options 105–9
 - travel speed 113
 - What Transport for Cambridge?* 99
- carbon emissions
 - London 178, 185, 186, 189–92
 - London Congestion Charging Scheme (LCCS) 177, 178, 187–9
 - Paris 256, 264, 265–6
 - Stockholm Trial 301
 - UK 42, 46, 47, 122–3, 125, 126, 189–90, 196–7
 - United States 199
- Carmichael, Alistair 131
- carpools
 - London Congestion Charging Scheme (LCCS) 4, 224
 - Seattle, Puget Sound pilot 316
 - Stockholm Trial 5, 300
 - UK 47, 96
 - United States 370
 - see also* HOV (high occupancy vehicle) lanes
- Castelazo, M. and T. Garret 365

- Castle, Barbara 118, 119
 Cervero, R. 362
 Chan, S. 213
 Cheshire, P.C. 76
 Cho, Sungbin 342–56
 cities as revenue claimants 358–60, 361,
 368–70, 372, 373, 375–6
 Clark, W.A.V. 348
 commercial traffic
 London 184–6
 London Congestion Charging
 Scheme (LCCS) 62, 163, 164,
 165, 166, 167, 168, 170–71, 270
 Paris 268, 269, 270
 Stockholm Trial 300
 UK 62, 63, 71, 95–6
 commuter traffic
 Cambridge 106, 108, 110
 London 11, 85
 Seattle, Puget Sound pilot 332
 UK 85, 225
 United States 11, 222–3, 224–5, 328,
 330, 332, 334, 337–8
 congestion charging
 area licence *see* area licensing
 cities as revenue claimants 358–60,
 361, 368–70, 372, 373, 375–6
 client politics 365
 cordon charging *see* cordon charging
 cost-benefit analysis 361–2
 design tools for road pricing cordons
see road pricing cordons, design
 tools for
 distance-based *see* distance-based
 schemes
 fragmented metropolitan areas
 369–70
 free-rider problem 364–5, 366, 370
 licence plate bans 201
 loss aversion 363–4, 366, 370
 policy implementation *see* policy
 implementation
 policy transfer *see* policy transfer
 politics of 361–8
 public service benefits 361, 362
 regional authorities as revenue
 claimants 359
 revenue proposals, previous 365–8
 revenue redistribution *see* revenue
 redistribution
 technology *see* technology
 traffic jams, psychological cost 271
see also individual cities and
 countries
 Coombs, C.H. 220
 cordon system
 design tools *see* road pricing
 cordons, design tools for
 Edinburgh 280, 285
 United States 6–7, 10
 corridor projects
 free corridors, London Congestion
 Charging Scheme (LCCS) 3,
 171–3, 182
 United States 8, 10, 319
 cost-benefit analysis
 congestion charging 361–2
 London Congestion Charging
 Scheme (LCCS) 4–5, 6, 63, 189,
 362–3
 SR 91, Southern California 349–52,
 353–4
 Stockholm Trial 5–6, 304–5, 361,
 362, 362–3
 UK road pricing 47–9, 62–3, 69–78,
 120, 121, 123
 United States 7, 8, 12, 227, 287, 290,
 343, 352
 Crane, R. and D. Chatman 328
 Crawford, I. 69, 199
 credit-based payment systems, Seattle,
 Puget Sound pilot 320
 cycles
 Cambridge 114
 London Congestion Charging
 Scheme (LCCS) 4, 169, 171,
 224, 270
 London network 186
 Paris 263, 268–9, 270
 Paris cycling tracks 258, 259
 Stockholm Trial 301
 UK 224
 UK tracks 48, 52
 United States 224
 Daniel, J. and K. Bekka 199
 Darling, Alistair 57, 61, 121, 123–4,
 126–8
 Davies, Andrew 131
 Deakin, E. and G. Harvey 364, 373

- Deb, K. 145
 DeCorla-Souza, P. 287, 288
 Denmark
 infrastructure costs 237
 vignette licence 234
 distance-based schemes
 Europe 237
 HGVs in Germany 246–7, 248–9
 Hong Kong 280, 285
 lorry-charging scheme, UK 63, 68,
 121–2, 130
 Dodgson, J. 165
 Doll, C. 241
 Dolowitz, D. 214–16, 225–6
 DSRC (dedicated short range
 communication) system 245
 Duchêne, Chantal 257

 Echenique, Marcial 98–117
 economic impact
 London Congestion Charging
 Scheme (LCCS) 212, 217–18,
 270
 London GLA economics study
 190–92
 and policy transfer 217–18
 Stockholm Trial 5, 303–5
 UK 49, 51, 54, 68, 69, 72, 75–6, 78,
 123
 Edinburgh
 bus deregulation 282
 network, design tools test 145–8, 281
 road pricing cordons 280, 285
 road pricing cordons, design tools
 for 145–54
 scheme rejection 10, 11, 26, 29, 131,
 228, 281
 electronic road pricing (ERP) 201
 Hong Kong 282
 see also automatic number plate
 recognition (ANPR)
 Eliasson, Jonas 5, 293–309, 361, 362
 emission rates
 Cambridge predictions 110, 111
 Emissions Trading Scheme (ETS),
 Europe 189, 190
 Euro emissions standards 184–5, 194
 London low emissions zone (LEZ)
 183–6, 192
 Paris 254, 257, 263–6
 tolls, proposed, London Congestion
 Charging Scheme (LCCS) 3–4,
 122
 see also carbon emissions; nitrogen
 oxide emissions; particulate
 matter emission
 emission rates taxi emissions strategy,
 London 184–5, 190
 Enoch, M. 277
 environmental issues
 Cambridge 110, 111, 114, 115
 Europe 184–5, 194, 234, 236, 240–41
 Germany 246, 249
 London 176–99, 211
 London Congestion Charging
 Scheme (LCCS) 177–9, 187–9,
 270
 low emissions zone (LEZ) 183–6,
 192
 Paris 268, 269, 270
 pollution and traffic speed 263–4
 Stockholm Trial 301–2, 308
 UK 45–7, 51, 53–4, 62, 68–9, 71–2,
 75, 79, 122, 132–3
 see also carbon emissions; emission
 rates; nitrogen oxide emissions;
 particulate matter emissions
 Europe
 accident cost estimation 241–3
 congestion charging, framework
 analysis for policy
 implementation 277–9
 congestion cost estimation 241
 distance-based charges 237
 Emissions Trading Scheme (ETS)
 189, 190
 environmental issues 184–5, 194,
 234, 236, 240–41
 EU Directive on interoperability 129
 Euro emissions standards 184–5, 194
 Eurovignette Directive 233, 234–6,
 244
 experience, relevance of in United
 States 286–90
 Fair Payment for Infrastructure
 White Paper 236
 fuel tax 234, 237
 HGV (heavy goods vehicles) charges
 233, 234–5, 236, 237, 241, 243
 IASON project 243

- impact assessment 243–4
- impact pathway approach (IPA) 240
- IMPRINT project 250
- INFRAS/IWW study 241
- infrastructure cost estimation 237–40
- infrastructure financing
 - recommendation 234, 235–6
- inter-urban road goods vehicle
 - pricing 233–51
- Lindberg study 240
- new charging systems 244–7
- new charging systems, impact of 247–9
- PRIMA (Pricing Measures Acceptance) project 245
- RECORDIT project 241
- short-run marginal cost (SMC) 236–43
- technological standards, common 64
- TIPMAC project 243–4
- toll differentiation 236
- trans-European roads network 234–5
- transport policy, EU Commission
 - Green Paper (1995) 233
- UNITE project 240, 241, 243
- vehicle licence duty 234, 237
 - see also* individual cities and countries
- Evans, A. 23, 69
- exemptions and discounts
 - London Congestion Charging Scheme 2, 3, 61–2, 161, 163, 167, 173, 179, 187–9, 201, 209, 220–23, 284
 - residents' discount, London
 - Congestion Charging Scheme 62, 173, 179, 188, 189, 201, 209
 - Stockholm Trial 295
 - truck fleet discount scheme, London
 - Congestion Charging Scheme 4, 167, 168, 170
 - UK road pricing 61–2
- Eynman, Tim 314
- FasTrak
 - United States 11, 370–72, 377
 - see also* California SR91
- Fielding, G. and Klein, D. 370
- Finland, infrastructure costs 237
- France, Paris *see* Paris
- free-rider problem 364–5, 366, 370
- Friedrich, R. and P. Bickel 240
- fuel prices
 - Europe 234, 237
 - Paris 260
 - Seattle, Puget Sound pilot 314, 315
 - Stockholm Trial 302
 - UK 39, 40, 50, 52–4, 57, 60–61, 65, 71–2, 75, 83, 94, 121–3, 125–6, 130, 132–3
 - United States 8, 368
- Garrison, W.L. and J.D. Ward 368
- Gaunt, M. 281
- Germany
 - alternative toll-free routes 249
 - environmental performance 246, 249
 - HGV distance-based charging 246–7, 248–9
 - infrastructure costs 237, 239, 240
 - low emissions zone (LEZ) 192
 - OBUs (on-board units) 247
 - private sector involvement 246
 - satellite tracking 246–7
 - vignette licence 234
- Giuliano, G. 11, 223, 224, 329, 362
- Glaister, Stephen 29, 39, 44–7, 57–97, 119
- Goldsmith, Jan 370–71, 372
- Gómez-Ibáñez, J. 23, 369, 377
- Goodwin, P. 127, 358, 365–6, 367, 368
- Gordon, Peter 11, 222, 223, 224, 327–56
- GPS technology *see* satellite technology
- Graham, Daniel J. 29, 39, 44–7, 57–97
- Grayling, Chris 95, 131
- Greene, E. and V. Stone 59
- Gummer, John 122, 131
- Gunn, L.A. 274–6, 277
- Gwilliam, K.M. 23
- Hahn, W. 246
- Hall, J. 199
- Han, X. and B. Fang 344
- Hargreaves, Tony 98–117
- Harrington, W. 199
- Hau, T. 282
- Hensher, D.A. and A.J. Reyes 338

- HGV
 Austria distance-based charging 245–6, 248
 Europe, charges in 233, 234–5, 236, 237, 241, 243
 Germany distance-based schemes 246–7, 248–9
 onboard devices (Go-Boxes) 245, 248
 Switzerland *see* Switzerland
 truck fleet discount scheme, London Congestion Charging Scheme (LCCS) 4, 167, 168, 170
- Higgins, T.J. 286
 Hinze, S. and K. Baker 376
 Ho, Kenny 198–211
 Hogwood, B.W. and L.A. Gunn 275
 Holford, W. and H.M. Wright 98
 Hong Kong
 automatic vehicle identification (AVI) 282
 distance-based scheme 280, 285
 electronic road pricing (ERP) trial 282
 revenue neutrality 366
- HOV (high occupancy vehicle) lanes
 Seattle, Puget Sound pilot 314
 United States 6, 8, 9, 56, 227, 319, 327–8, 338–40, 342–3, 349–52, 370–72
see also carpools
- Hu, P.S. and J.R. Young 329, 334
 Hugosson, Muriel Beser 5, 293–309
- IASON project 243
 Ison, Stephen 273–92
- Japan, low emissions zone (LEZ) 192
- Johnson, M.B. 1
- King, David 357–82
 Kitchen, Matthew 313–26
 Kocak, N.A. 283
 Kockelman, K.M. and S. Kalmanje 366
 Koh, A. 138–55
 Kopp, Pierre 6, 252–72, 327
 Kossak, I.A. 248
 Krupnick, A. and P. Portney 199
- Ladyman, Stephen 122, 124, 125
 Lawphongpanich, S. and D.W. Hearn 154
 Leape, J. 2
 Lee, Bumsoo 223, 224, 327–41
 Lee, Shin 212–19, 222, 223, 224
 legislation *see* policy implementation
 Lewis, H.G. 28
 Lewis, N.C. 284
 licence plate bans 201
 Lindberg, G. 240, 241, 243
 Link, H. 237, 240
 Linnett, S. 51–2
 Litman, T. 287, 288
 Liu, L.N. and J.F. McDonald 23
 Livingstone, Ken 2, 3, 50, 120, 122, 218, 219
 local authority involvement, UK 42, 49–52, 65, 78, 120, 124–5, 127–9, 131–3
- London
 air pollution and health 189, 190, 197, 198–9
 air quality websites 211
 ambient air quality 187, 188, 189–90, 198–211
 automatic number plate recognition (ANPR), and LEZ 184
 bus fuels 185
 buses and LEZ 184, 185, 190
 car ownership 47, 48, 86, 87, 176
 carbon emissions 178, 185, 186, 189–92
 commercial vehicles and LEZ 184–6
 commuter traffic 11, 85
 congestion cost estimation 242
 cycling network 186
 environmental concerns 176–99, 211
 and Euro emissions standards 184–5
 fuel efficiency 47–8
 GLA economics study 190–92
 GLA Transport Act (1999) 122
 GLC Area Control Study 119
 GLC Supplementary Licensing Scheme 119
 Greater London Act (1999) 42, 120, 218
 hybrid and hydrogen buses 185
 London Assessment Studies 119

- low emissions zone (LEZ) 183–6, 192
- nitrogen oxide emissions 178, 184, 185, 186, 190–92
- noise pollution 179
- particulate matter emissions 184, 185, 186, 190–92
- public transport use 3, 41, 47, 48, 67, 131, 184, 185, 190, 225
- ring motorways 48, 53
- road accidents 187
- road pricing, urgent need for 67
- suburb congestion 48, 75, 76–7
- taxi emissions strategy 184–5, 190
- traffic speeds 77, 163, 201, 222
- Transport for London budget 61, 70, 125, 131, 201, 219, 367
- travel distances per person 176–7
- Underground use 3, 47, 201
- walking schemes 4, 186–7
- London Congestion Charging Scheme (LCCS)
 - acceptability of 218–20, 228
 - and alternative fuel use 187
 - area limits 159, 160
 - automatic number plate recognition (ANPR) 2, 161, 170–71
 - boundary routes 171
 - bus transport improvement 201, 212, 218, 270
 - car journeys, reduction in 224–5
 - car ownership 173, 223, 362
 - car pools 4, 224
 - carbon emissions 177, 178, 187–9
 - charges and times 2, 3, 107, 221, 222
 - clean vehicle discounts 187–9
 - commercial vehicles 62, 163, 164, 165, 166, 167, 168, 170–71, 270
 - congestion charge elasticity 167–8
 - congestion levels prior to charging 222, 223
 - congestion reduction 161–2
 - cost-benefit analysis 4–5, 6, 63, 189, 362–3
 - criticism of 4, 120, 284
 - cycles 4, 169, 171, 224, 270
 - decision making and implementation 218–22, 270
 - demand elasticities 162–8
 - Department for Transport (DFT) survey 59–60, 79, 139–41
 - economic impact 212, 217–18, 270
 - emission rate tolls, proposed 3–4, 122
 - environmental issues 177–9, 187–9, 270
 - equipment costs 63
 - and EU Emissions Trading Scheme (ETS) 189, 190
 - exemptions and discounts 2, 3, 61–2, 161, 163, 167, 173, 179, 187–9, 201, 209, 220–23, 284
 - free corridors 3, 171–3, 182
 - fuel use 178, 204
 - funding 12
 - Hearing London's Views survey 219
 - inefficiency of 4–5
 - Kensington and Chelsea Borough 2, 3, 202, 221
 - marginal congestion costs 168–71
 - nitrogen oxide emissions 177, 178
 - official review (2005) 212
 - overview 2–5, 42, 50, 66, 68, 159–61, 201–3, 280, 329
 - particulate matter emissions 177–8, 198–9, 203–10
 - payment options 159–61
 - Penalty Charge Notice (PCN) 161
 - policy transfer framework 213–18
 - political success 5, 218–22
 - public consultation 219, 220–21
 - public transport 3, 10, 162, 166, 169–70, 173, 176, 186–7, 201–2, 212, 218–19, 225, 270
 - Report to the Mayor 221
 - Research Programme 119
 - residents' discount 62, 173, 179, 188, 189, 201, 209
 - retail sales 5
 - revenue redistribution 3, 61, 66, 70, 125, 201, 219, 367
 - Road Congestion Charging Options for London (ROCOL) (2000) 177, 218
 - Scheme Order 220, 221
 - scheme specifications, determination of 220–22
 - taxis 4, 162–7, 170, 171, 173, 189, 202, 222

- and theatre owners 221
- time values 163–4, 169, 201, 202, 212, 269
- traffic speed 3, 6, 162–3, 168–9, 173, 178, 181, 199–200, 202, 224, 265
- traffic volume 161–2, 169, 170, 173, 178, 179, 181, 202, 212
- Transport Strategy draft 220, 221
- travel characteristics, understanding 222–5
- trip reductions 3, 4, 10
- truck fleet discount scheme 4, 167, 168, 170
- US cities, possible transfer to 9–10, 212–29
- Variation Order (2005) 179–83
- vehicle generalised costs 165–6
- vehicle generalised costs elasticities 166–7
- vehicle operating costs 164–6
- vehicle technology improvement 179
- Western Extension 2, 3, 171–4, 179–83, 187, 209, 280, 284
- Western Extension, public consultation 179–83
- Westminster Borough 2, 202, 221
- London Congestion Charging Scheme (LCCS) and ambient air quality 3–4, 198–211
- Bloomsbury figures discounted 203–4, 209
- data and model specification 203–6
- meteorological influences 204–5, 207, 209
- model results 206–10
- perimeter residence, disadvantage of 208, 209
- policy decisions 200–201
- Lowry, I.S. 99
- Luxembourg, vignette licence 234
- Lyons, G. 59, 123
- McAfee, R.P. 23
- McCarthy, P.S. and R. Tay 329
- McGuckin, N. and Y. Nakamoto 337
- McKinnon, A. 121, 245, 248
- McMillen, D.P. 329–30
- Maddison, David 198–211
- Manville, Michael 357–82
- Maskin, E. 24, 28
- Matthews, Bryan 233–51
- May, Anthony D. 23, 119, 138–55
- Menaz, Batool 233–51
- Merron, Gillian 132
- Moore II, James E. 342–56
- Mossberger, K. and H. Wolman 215, 216, 218, 226
- Mott Report 98
- Nash, Chris 233–51
- Nash, J. 28, 29
- Netherlands
 - infrastructure costs 237
 - satellite technology 127
 - vignette licence 234
- nitrogen oxide emissions
 - London 178, 184, 185, 186, 190–92
 - London Congestion Charging Scheme (LCCS) 177, 178
 - Paris 257, 264, 265
 - UK 191, 196–7
 - United States 199
- Norris, Steve 122
- Northern Ireland 130
- Norway
 - Bergen 280, 283–4, 285
 - congestion pricing scheme 1, 56
 - policy implementation 277
- OBUs (on-board units) 247, 287, 295
- Olson, M. 364–5
- Pan, Qisheng 342–56
- Paris
 - agglomeration 252
 - anti-car policies 257–8
 - Boiteux report 268
 - bus lanes 255, 258, 259–60, 267
 - bus services 254, 255, 256, 258, 259–60, 263, 267, 268–9, 270
 - bus speed 259–60, 263, 268–9, 270
 - car speeds 253, 254, 259, 261–2, 263, 270
 - car traffic decrease 1991–2001 255
 - car usage 254, 259, 260–62, 269, 270
 - carbon emissions 256, 264, 265–6
 - commercial traffic 268, 269, 270
 - cycle tracks 258, 259
 - cycle usage 263, 268–9, 270
 - environmental issues 268, 269, 270

- fuel prices 260
- Metro 254, 256, 257, 258, 262
- modal distribution of motorised transport 255–6
- motorbikes (two-wheeler traffic) 256, 259, 263, 265, 266
- municipality 252
- nitrogen oxide emissions 257, 264, 265
- parking 254–5, 258, 259
- particulate matter emissions 257, 264, 265
- policy changes from 2001 257–66
- political organisation 252–3
- pollutant emissions 254, 256, 257, 263–6, 264, 265
- pollution reduction 256–7
- public transport 253–4, 255, 256, 257, 258, 259–60, 262–3, 268–70
- RER and suburban trains 254, 256, 257, 262
- road safety 266
- street network 254–5, 258
- taxis 256
- traffic restraint policy 252–72
- traffic restraint policy, costs and benefits 266–9
- transport in 2000 254–7
- welfare loss for car users 267
- park-and-ride
 - Cambridge 107, 108, 114
 - Stockholm Trial 5, 293, 295, 296, 302
 - UK 48, 52
- parking schemes 277–8
 - Paris 254–5, 258, 259
 - UK workplace 119–20
- Parsons, W. 274
- particulate matter emissions
 - London 184, 185, 186, 190–92
 - London Congestion Charging Scheme (LCCS) 177–8, 198–9, 203–10
 - Paris 257, 264, 265
 - Stockholm Trial 301
 - UK 191, 196–7
- pay-as-you-drive proposals, UK 54, 127
- Perry, M.K. and R.H. Porter 23
- policy implementation
 - communication, importance of 278, 279, 280, 282, 283, 285, 288, 289
 - complexity of 278
 - conceptual framework 274–9, 288, 289–90
 - conceptual framework, empirical validation 279–86
 - and enabling legislation 278, 284, 285, 289–90
 - logic and internal consistency 277–8, 281, 284, 285
 - modified framework 277–9
 - political ‘champion’, importance of 277, 278, 280, 281–2, 283, 284, 288, 289
 - UK road pricing, regulation of road utilities 51–2, 126
- policy transfer
 - decision making stages 216, 217–18
 - effectiveness assessment 215
 - history of 214
 - incomplete 215–16
 - London Congestion Charging Scheme (LCCS) 213–18
 - socio-economic impact 217–18
 - transfer failure 214–16
 - United States, and UK experience, relevance of 9–10, 55–6, 212–29
- Poole, R.W. and C.K. Orski 9, 327, 338–9, 340
- Poterba, J.M. 69
- Prescott, John 119, 120, 130
- Pressman, J. and A. Wildavsky 274, 276, 278
- PRIMA (Pricing Measures Acceptance) project, Europe 245
- private sector involvement
 - Germany 246
 - UK 42, 50, 51–2, 53
 - United States 12, 286
- Proost, S. and K. Van Dender 199
- Prud’homme, Rémy 4–5, 6, 212, 252–72, 327
- public transport
 - bus services *see* bus services
 - Cambridge 105, 107, 108, 110, 112–14, 115, 280–81
 - London 41, 47, 48, 67, 131, 184, 185, 190, 225

- London Congestion Charging Scheme (LCCS) 3, 10, 162, 166, 169–70, 173, 176, 186–7, 201–2, 212, 218–19, 225, 270
- Paris 253–4, 255, 256, 257, 258, 259–60, 262–3, 268–70
- Stockholm Trial 5–6, 293, 295, 296, 300–303, 305, 308, 309, 362
- UK *see* UK public transport
- Raux, C. 269
- RECORDIT project, Europe 241
- referendums, Stockholm Trial 7, 293, 306–7
- regional authority
 - as revenue claimants 359
 - UK involvement 49–51
- retail trade
 - and London Congestion Charging Scheme (LCCS) 5
 - and Stockholm Trial 304
- revenue redistribution
 - Cambridge 114, 115, 280
 - London Congestion Charging Scheme (LCCS) 3, 61, 66, 70, 125, 201, 219, 367
 - Scotland 48–9
- Richards, Martin G. 118–37, 139, 141
- Richardson, Harry W. 1–20, 69, 326, 342–56
- Richmond, J. 365
- road pricing cordons, design tools for 138–55
 - and Edinburgh network 145–54
 - EMME/2 package 151
 - genetic algorithms (GA-AS method) 142–8, 152, 154
 - interview evidence 141–2
 - Mathematical program with Equilibrium Constraint (MPEC) 143
 - model-based studies 139–41
 - optimal charging cordon (OPC) 146–7, 150, 152
 - optimal double-cordon scheme (D-OPC) 147, 148
 - past approaches to design 139–42
 - SATURN model 143, 145, 151, 154
 - select link analysis (SLA), short-cut method based on 148–54
 - TRANPLAN package 151
- road safety
 - accident cost estimation, Europe 241–3
 - London road accidents 187
 - Paris 266
 - Stockholm Trial 5, 302
 - UK road accidents 46
- Roth, G. 327
- Rothengatter, W. 246
- Rubin, T. 225
- rural drivers, UK 45, 46, 47, 49, 67, 72, 75, 76, 77, 78, 81–2, 83
- Rye, Tom 273–92
- Salant, S.W. 23
- Sansom, T. 237
- Santos, Georgina 4, 69, 159–75, 270, 329
- satellite technology
 - Germany 246–7
 - Netherlands 127
 - Seattle, Puget Sound pilot 313, 320–23, 324–5, 326
 - UK 121, 127
 - United States 8, 12
- SATURN model, road pricing
 - cordons, design tools for 143, 145, 151, 154
- Saunders, J. and K. Lewin 281
- Schaller, B. 7
- Scotland 47, 48–9, 87, 88, 96–7, 132
 - Edinburgh *see* Edinburgh
 - Forth Bridge tolls 127
 - fuel efficiency 47
 - fuel purchase 87, 88
 - income deprivation 96–7
 - and national charging 132
 - revenue redistribution 48–9
 - Scottish Assempby transport legislation (2001) 42, 130
 - Transport (Scotland) Act (2005) 281
 - travel times 29
- Scott, Tavish 131
- Seattle, Puget Sound pilot
 - and Alaskan Way viaduct 314
 - bridge tolls 319–20
 - carpools 316

- commuter traffic 332
- credit-based payment systems 320
- and employment share 331
- endowment account 320
- equity concerns 325
- fiscal background 315–17
- fuel prices 314, 315
- GPS technology 313, 320–23, 324–5, 326
- high occupancy vehicle (HOV) lanes 314
- overview 315, 319–23
- permanent scheme obstacles 325–6
- public resistance to transportation taxation 314, 315, 325
- results of pilot 323–5
- solo driving 315, 316
- and state rail projects 314, 325
- traffic trends, recent 313–14, 315–16
- traffic-calming measures 325–6
- transponders 320
- and unpriced arterial roads 325
- vehicle-miles travelled (VMT) 314, 315, 316–17, 323–5
- Washington State political background 8, 314
- Seoul, congestion charging scheme 23
- Sheffi, Y. 147, 149
- Shepherd, S.P. 138–55
- Shoup, Donald 357–82
- Singapore, congestion charging scheme 1, 23, 216, 286, 329, 362, 363, 367
- Small, K. 23, 95, 329, 343, 352, 365, 366, 367
- Smeed, R. 55, 118
- solo driving
 - California SR91 350, 351
 - Seattle, Puget Sound pilot 315, 316
 - United States 319, 332, 350, 351
- Stern, N. 116
- Stockholm Trial
 - automatic number plate recognition (ANPR) 294–5
 - bus travel times 302
 - car journeys, reduction in 300, 308–9
 - carbon emissions 301
 - carpooling 5, 300
 - commercial traffic 300
 - comparison with other measures and investments 308
 - congestion pricing experiment 5, 283, 285, 293–309
 - congestion pricing, proposed reintroduction 293–4
 - congestion pricing system 294–5
 - congestion pricing system, trial costs 295–6
 - cost-benefit analysis 5–6, 304–5, 361, 362, 362–3
 - cycling 301
 - eastern bypass 308
 - economic impact 5, 303–5
 - environmental issues 301–2, 308
 - Essinge bypass 5, 295, 298, 299, 300
 - exclusion zones 5
 - exemptions 295
 - fuel prices 302
 - funding 12
 - and Green Party 10
 - Lidingö Island 5
 - media opinion 305–6
 - noise level reduction 5
 - on-board units 295
 - overview 280, 294–6
 - park-and-ride facilities 5, 293, 295, 296, 302
 - particulate matter emissions 301
 - political opinion 6, 293–4, 306–7
 - public opinion 6, 305–7
 - public transport expansion 5–6, 293, 295, 296, 300–303, 305, 308, 309, 362
 - referendums 7, 293, 306–7
 - retail trade, effect on 304
 - revenue reinvestment 307, 308
 - road safety 5, 302
 - social benefits 6
 - southern link 298, 299, 300
 - technological success 5, 296, 303, 306
 - time-of-day tolls 5, 10
 - traffic volumes 296–8, 300, 302
 - travel surveys 300, 309
 - travel times 5, 6, 298–300, 301, 302, 308
 - urban environment improvement 301
 - western bypass 308
- Sullivan, E.C. 287, 288, 339–40
- Sumalee, A. 138–55

- Sweden
 Congestion Charges Act (2004) 5
 infrastructure costs 239, 240
 low emissions zone (LEZ) 192
 vignette licence 234
- Switzerland
 Heavy Vehicle Fee (HVF) 244–5, 247
 HGV kilometre-based charges
 244–5, 247–8
 HGV lorries, number of 247–8
 HGV onboard units (OBU) 245
 HGV sales, increased 247
 infrastructure costs 237, 239, 240,
 245
 rail sector 247, 248
- technology
 automatic number plate recognition
see automatic number plate
 recognition
 credit-based payment systems 320
 DSRC (dedicated short range
 communication) system 245
 electronic road pricing (ERP) 201,
 282
 European common standards 64
 GPS *see* satellite technology
 OBUs (on-board units) 247, 287, 295
 pay-as-you-drive proposals, UK 54,
 127
 satellite *see* satellite technology
 Stockholm Trial 5, 296, 303, 306
 transponders 320, 343
 and UK road pricing feasibility 126,
 127, 128, 129
- TIPMAC project, Europe 243–4
- Tokyo, congestion charging scheme 23
- traffic jams, psychological cost 271
- TRANPLAN package, road pricing
 cordons, design tools for 151
- transponders
 Seattle, Puget Sound pilot 320
 SR91, Southern California 343
- Travers, T. and S. Glaister 66
- TRIPON-Box 248
- UK
 air pollution 46
 bicycle use 224
 Bristol 131
 bus privatisation 23, 131–2, 219
 bus transport usage 186
 business relocation 47
 Cambridge *see* Cambridge
 car efficiency 41
 car ownership 10, 41, 47, 48, 51, 86,
 87, 224
 car sharing 47, 96
 carbon emissions 42, 46, 47, 122–3,
 125, 126, 189–90, 196–7
 Charging Development Partnership
 141
 CILT report 128
 commercial vehicles 62, 63, 71, 95–6
 commuter traffic 85, 225
 ‘compact city’ policy 75–6
 congestion by road type 241, 242
 Conservative ‘Quality of Life’ policy
 review 122, 131
 cycle tracks 48, 52
 Department for Transport (DFT)
 survey 59–60, 79, 139–41, 148,
 152
 deprivation index 79–83, 84–5, 86,
 89, 93, 96–7
 Durham 55, 64, 120
 Environmental Audit Committee
 report 122
 environmental issues 45–7, 51, 53–4,
 62, 68–9, 71–2, 75, 79, 122,
 132–3
 and EU Directive on interoperability
 129
 ‘Feasibility Study of Road Pricing in
 the UK’ (2004) 49, 63, 96, 118,
 120–21, 123, 126, 127
 fuel duty 39, 40, 50, 52–4, 57, 60–61,
 65, 71–2, 75, 83, 94, 121–3,
 125–6, 130, 132–3
 Fuel Duty Escalator 123
The Future of Transport White Paper
 127
 health advantages 75–6
 Independent Transport Commission
 (ITC) reports 39–40, 44, 48,
 51–2, 128
*Introduction to Modelling and
 Appraisal for Road Pricing* 129
 Leeds 149, 152
 local authority involvement 42,

- 49–52, 65, 78, 120, 124–5, 127–9, 131–3
- London *see* London
- lorry-charging scheme, distance-based 63, 68, 121–2, 130
- low-income drivers 45, 71, 79–81
- Lyons Inquiry 126
- motorways and trunk roads 48, 53, 66, 120, 130
- ‘national’ scheme, meaning of 64–7
- night drivers 45
- nitrogen oxide emissions 191, 196–7
- noise pollution 46
- non-work trips 224, 225
- Northern Ireland 130
- park-and-ride facilities 48, 52
- particulate matter emissions 191, 196–7
- pay-as-you-drive proposals 54, 127
- planning and land-use policy 67–8
- policy clarity, need for 278
- political consensus 49
- political risk 10, 42, 51
- private sector involvement 42, 50, 51–2, 53
- property taxes 50
- public expenditure, returning surplus to 45, 60, 61
- rail transport 67
- regional authority involvement 49–51
- road capacity, increasing 63–4
- road casualties 46
- road franchises 53, 54–5
- road improvement schemes 51, 52, 53, 56, 60, 123
- Road Transport Bill (2006/7) 129–30
- road vehicles, number of 41
- Royal Automobile Club survey 50, 59
- rural drivers 45, 46, 47, 49, 67, 72, 75, 76, 77, 78, 81–2, 83
- satellite-based systems 121, 127
- Scotland *see* Scotland
- shopping centres, out-of-town 67
- Smeed Committee 118
- suburb congestion 48, 55–6, 75
- Sustainability Strategy 196–7
- technological standards, common 64
- Ten Year Transport Plan (2000) 118, 119–20, 126, 130
- time of travel 47, 69, 71, 95–6, 121
- time value 29, 68, 70, 72
- toll bridges and tunnels 53
- traffic speeds 41, 72, 76, 77, 85
- traffic volumes 46, 47, 48, 53, 69, 72–6, 81–2, 83
- Transport Act (1985) 219
- Transport Act (2000) 42, 64, 120, 122, 129–30
- Transport Innovation Fund (TIF) 42, 49, 51, 65, 123–5, 127, 131
- Transport White Paper (2004) 42
- travel and transport trends: 1980–2004 40–43
- vehicle emission durability 194–5
- vehicle excise duty 53, 54, 60, 121, 122–3, 125, 130, 187–8
- Wales 47, 48–9, 87, 88, 96–7, 130, 131, 132
- workplace parking schemes 119–20
- York 149, 152
- UK, inter-modal equilibrium 23–38
 - fare determination 29–32
 - and government revenue 32–3, 35
 - model 24–8
 - results 28–34
 - transit mode shares 33, 36
 - travel market competition 29–32, 34, 35, 36
- UK public transport
 - costs 43
 - effectiveness of 131–2
 - fares 132
 - subsidies 41, 124
 - use 40–41, 46, 48, 67, 76, 186, 224
- UK road pricing
 - charging decisions and redistribution 44–7, 49, 50, 52, 53, 60–61, 63, 66, 68, 69, 70, 71–2, 75, 77–8, 81, 119, 123, 125–6, 132
 - concessions 77
 - cost-benefit analysis 47–9, 62–3, 69–78, 120, 121, 123
 - design tools *see* road pricing
 - cordons, design tools for and devolution *see* Northern Ireland; Scotland; Wales and driver behaviour 47

- economic efficiency 49, 51, 54, 68, 69, 72, 75–6, 78, 123
- equipment costs 63
- equity issues 85–6
- exemptions and discounts 61–2
- fairness concerns 79–89
- history of studies 118–20
- and household budgets 86–9, 93
- implementation costs 121
- local, regional and national
 - considerations 49–51, 52, 64–8
- modelling effects 69–71, 93–7
- modelling effects, results at ward level 72–8
- national charging 132–3
- policy implications for other policies 67–8
- policy objectives, possible 58, 63–4, 68
- policy prospects 118–37
- policy rationale 122–3
- and political consensus 130–31, 133–4
- practicalities of national 57–97
- public attitudes 59–68
- regulation of road utilities 51–2, 126
- revenue collection costs 77–8, 90
- revenue neutrality 61, 65, 66, 71–2, 74, 75, 76–7, 78, 81, 83, 86, 89, 125
- revenue raising methods 60–61, 62–3
- revenue-additional policy 71–2, 73, 75, 76, 77–8, 83, 86
- technological feasibility 126, 127, 128, 129
- and typical trips 84–6
- and urbanisation differences 83–4
- welfare benefits 70, 75–6, 140, 145–6, 149
- welfare concerns 79–83
- UNITE project, Europe 240, 241, 243
- United States
 - area licensing 6–7, 10, 319
 - bicycle use 224
 - California *see* California
 - car use 10, 219, 224
 - car ownership 328, 363
 - carbon emissions 199
 - carpools 370
 - Census Transportation Planning Package (CTPP) 328
 - commuter traffic 11, 222–3, 224–5, 328, 330, 332, 334, 337–8
 - congestion charging, history of 286–7
 - congestion pricing schemes, overview 6–12, 199, 362, 367
 - congestion pricing schemes, success of 287–9
 - congestion survey 223
 - cordon system 6–7, 10
 - corridor projects 6, 8, 10, 319
 - cost-benefit analysis 7, 8, 12, 227, 287, 290, 343, 352
 - decentralization 7, 10, 329–32
 - direct and chained tours 336, 337–8
 - equity issues 11–12
 - and European and Asian experience, relevance of 286–90
 - experimental congestion pricing schemes 317–19
 - FasTrak 11, 370–72, 377
 - Fiscal Disparities Act 376
 - freeway-only scheme 10, 319, 372–5
 - fuel taxation 8, 368
 - funding 12, 287
 - GPS equipment 8, 12
 - highway congestion pricing 327–41
 - highway congestion pricing, data used 328–9
 - highway financing 10
 - HOV (high occupancy vehicle) lanes 6, 8, 9, 56, 227, 319, 327–8, 338–40, 342–3, 349–52, 370–72
 - Hudson River crossings 287
 - infrastructure investment 8, 287, 368
 - institutional constraints 11, 288–90
 - Intermodal Surface Transportation Efficiency Act (ISTEA) 227, 287
 - Katy Freeway, Houston 288, 317
 - Lexus lanes 11
 - and London experience, relevance of 9–10, 212–29
 - Los Angeles *see under* California
 - low-income drivers 11
 - Manhattan Institute study 7
 - Minneapolis–St Paul (Twin Cities) 366–7, 375–6

- National Household Travel Survey (NHTS) 328, 329
- Nationwide Personal Transportation Surveys (NPTS) 328, 329
- New York City 7–8, 10, 219, 222–3, 319, 330, 331, 332, 376–7
- nitrogen oxide emissions 199
- non-work trips 224, 225, 227, 332–8
- on-board units 287
- peak-hour charging suggestion 227
- policy direction agreement 289
- policy implementation, conceptual frameworks 274–9
- policy legislation 289–90
- political acceptability 7, 219
- political champions 288, 289
- political support, lack of 10, 319, 359
- private sector involvement 12, 286
- public acceptability 288
- public transport use 219, 223, 224–5, 359, 367, 371–2
- rail projects 225
- Reason Foundation 10
- SAFETEA-LU 287
- San Diego County *see under* California
- San Francisco *see under* California
- Seattle, Puget Sound pilot *see* Seattle, Puget Sound pilot
- solo drivers 319, 332, 350, 351
- SR91, Southern California *see under* California
- taxi medallion restrictions 7
- Texas 11, 288, 290, 317, 318
- time-of-day tolls 10–11
- toll bridges 7, 343, 377
- toll roads 1, 286, 287, 289, 317–19, 342–56
- traffic analysis zones (TAZs) 328, 344
- Transport Efficiency Act (TEA) (1998 and 2001) 287
- travel speeds 328
- travel times 199, 328
- trip chains 336, 337–8
- Twin Cities region 366–7, 375–6
- UK, lessons from 9–10, 55–6, 212–29
- Urban Partners program 8
- value pricing pilot program 227, 287, 290, 343, 352
- vehicle licence duty 8
- Washington State *see* Seattle, Puget Sound pilot
- value pricing pilot program, United States 227, 287, 290
- Van Vliet, D. 143
- vehicle licence duty
- Europe 234, 237
- UK 53, 54, 60, 121, 122–3, 125, 130, 187–8
- United States 8
- Verhoef, E.T. 352
- Vickrey, W.S. 1
- vignette licence 233, 234–6, 244
- Wachs, M. 358
- Wales 47, 48–9, 87, 88, 96–7, 130, 131, 132
- Walters, A.A. 1
- Wardrop, J. 143
- Watkiss, P. 184
- Weimer, D.L. and A.R. Vining 276
- Wichiensin, Muanmas 23–38
- Wilson, J.Q. 358–9, 360, 365
- Winston, C. 362, 378
- Wolmar, C. 128

