

Subject index

A

- absorbing event 834
- accelerated failure-time model 914–920
- accelerated longitudinal design 263
- adaptive quadrature 596–602
- adjacent-category logit model 683
- adjusted means 37
- adjusted R square 149
- age-period-cohort 262
- agreement 85
- AIC . . . see Akaike information criterion
- Akaike information criterion 364
- analysis of covariance 35
- analysis of variance 17–19
- analysis time 830
- ANCOVA see analysis of covariance
- Anderson–Hsiao estimator 314
- ANOVA see analysis of variance
- antependence model 312
- applications
 - adolescent-alcohol-use data . . . 378, 426
 - airline-cost data 514
 - angina data 924
 - anorexia data 64
 - antibiotics data 1028
 - antisocial-behavior data . . 324, 376
 - army data 241
 - attitudes-to-abortion data 688
 - bladder-cancer data 962
 - blindness data 883, 965
 - British-election data 756, 1031
 - brothers²-school-transition data 882
 - buying-crackers data 753
- applications, *continued*
 - child-mortality data 861, 882, 964
 - children’s-growth data 387, 422
 - cigarette data 884, 1030
 - cigarette-consumption data . . . 379, 521
 - class-attendance data 66
 - cognitive-style data 330
 - contraceptive-method data 757
 - crime data 299
 - crop data 197
 - dairy-cow data 475, 628, 1027
 - dialyzer data 242
 - diffusion-of-innovations data . . 423
 - divorce data 888, 961
 - early-childhood-math-proficiency data 692, 885
 - electricity-supplier data 758
 - epileptic-fit data 818
 - essay-grading data . . . 129, 669, 688
 - exam-and-coursework data 476
 - faculty-salary data 11
 - family-birthweight data 243
 - fat-accretion data 425
 - Fife-school data 493, 513
 - first-sexual-intercourse data . . . 881
 - general-health-questionnaire data 127
 - Georgian-birthweight data 130, 194, 199
 - grade-point-average data 193
 - growth-in-math data 421
 - Grunfeld-investment data 484
 - Guatemalan-immunization data 971
 - head-size data 129

applications, *continued*

headache data 818
 healthcare-reform data .. 767, 1030
 high-school-and-beyond data ... 63,
 196, 239
 homework data 240
 hours-worked data 328
 housing-the-homeless data 755
 hybrid-car data 754
 infection data 965, 966, 1031
 inner-London-schools data 201,
 239
 instructional-improvement data ...
 469
 item-response data 1032
 jaw-growth data 193, 422
 Kenyan-nutrition data 447
 labor-participation data 561
 lip-cancer data 803, 823
 marriage data 689
 math-achievement data 468
 minimum-wage data 284
 multicenter-hypertension-trial
 data 471
 multiple-divorce data 962
 neighborhood-effects data 128,
 192, 516
 nitrogen data 518
 Ohio-wheeze data 624
 olympic-skating data 519
 patent data 821
 peak-expiratory-flow data 76,
 126, 432, 479, 481
 PISA data 632
 police-stops data 820
 postnatal data 376
 promotions data 835, 880
 rat-pups data 194
 recovery-after-surgery data 690
 reimprisonment data 960
 respiratory-illness data 685
 returns-to-schooling data 331
 salamander-mating data 998
 schizophrenia-trial data 645
 school-absenteeism data 823

applications, *continued*

school-effects data 472
 school-retention-in-Thailand
 data 631
 sex-education data 196
 skin-cancer data 824, 1031
 smoking-and-birthweight data .. 64,
 133, 520
 smoking-intervention data 687,
 1030
 STAR data 473, 474, 521
 tax-preparer data 323
 teacher-expectancy meta-analysis
 data 130
 teacher-turnover data 881
 toenail data 571, 624
 Tower-of-London data 1028
 transport data version 1 700
 transport data version 2: expanded
 form 707
 twin-hayfever data 1033
 twin-neuroticism data 127, 478
 unemployment-claims data ... 325,
 327, 426
 union-membership data 629
 U.S.-production data 470, 514
 vaginal-bleeding data 625
 verbal-aggression data 626, 686
 video-ratings data 515
 wage-panel data 195, 251, 271,
 339
 wheat-and-moisture data 241
 wine-tasting data 633, 691
 yogurt data 718
 Arellano-Bond estimator 316
 atomistic fallacy 1, 166
 attribute 705
 attrition 318, 768
 autocorrelations 267
 autoregressive-response model 308-
 312
 autoregressive structure .. 348-351, 620

B
 balanced data 255-256

- banded structure.....353–356
- bar plot 573
- baseline category logit model 699
- baseline hazard 845, 895, 901
- Bayesian inference 1007–1018
- Bayesian information criterion 364
- best linear unbiased predictor 119, 491
- between estimator 159–160
- BIC see Bayesian information criterion
- binary response see dichotomous response
- binomial distribution 623, 764
- bivariate linear regression model... 382
- bivariate normal distribution 210, 211, 658, 778
- BLUP see best linear unbiased predictor
- boundary estimates 109
- Breusch–Pagan test 96
- burn-in 1010

- C**
- caterpillar plot 230
- causal effect 60
- censoring 831–832
- Chamberlain fixed-effects logit model.. 619
- clinical trial 5, 571, 645
- clustered data 75, 431, 971
- cluster-randomized trials ... 4, 190, 196
- coefficient of determination 23, 148–151
- cohort-sequential design 263
- commands
 - adjcatlogit 683
 - anova 19
 - dropemptycells option 289
 - repeated() option 289
 - append 877
 - asclogit 711, 715
 - asmprobit 752
 - bayes
 - dryrun option 1011
- commands, bayes, *continued*
 - igammaprior() option 1011
 - initransom option 1012
 - nchains() option 1015
 - normalprior() option 1011
 - seed() option 1012
 - showreffects() option ... 1020
- bayesgraph
 - skip() option 1021
- bayesstats summary 1020
- by 525, 848
- clogit 618, 696, 710, 713
 - or option 618
- cloglog 867
- cmclogit 696, 711, 714, 723
 - casevars() option 714
 - noconstant option 711
- cmmixlogit 752
- cmmprobit 752
- cmrologit 752
- cmroprobit 752
- cmset 711, 725
- cmxtmixlogit 684, 725, 737, 745, 752
 - difficult option 758
 - intpoints() option 727
 - noconstant option 726
 - random() option 726
- _coef_table 66
- contrast 47
- correlate 206, 266
 - covariance option 206
- cubic spline 911
- egen 494, 502, 525, 647
 - anymatch() function 647
 - count() function.. 137, 205, 799
 - cut() function 862
 - group() function 502
 - mean() function... 173, 260, 647
 - rank() function 259
 - sd() function 475
 - tag() function 137, 494
 - total() function 494
- encode 433
- eq 660, 1035, 1038

commands, *continued*

estat aband.....317
 estat df.....93, 153
 estat icc..91, 441, 590, 657, 980
 estat recovariance.....217
 estat sargan.....318
 estat sd.....584, 659, 986
 coeflegend option.....121
 estat wcorrelation....148, 341,
 441, 621, 798
 at() option..148, 341, 360, 441
 covariance option.....426
 estimates save.....584
 estimates stats.....364
 estimates store.....584
 estimates table.....366
 expand.....750
 femlogit.....752
 fillin.....612, 666, 799, 955
 foreach.....173
 generate.....77
 gllamm.....585–586, 623, 684,
 731, 739, 744, 752, 1035–1037,
 1041–1052
 adapt option.....655, 981
 bmatrix() option.....1045
 cluster(*clustvar*) option...689
 denom() option.....623, 764
 eform option.....586, 656, 735,
 776, 983
 eqs() option.....661, 733, 739,
 777, 980, 990, 1036, 1044
 family() option.....585, 807,
 1036, 1044
 family(binomial) option..585
 family(poisson) option...776
 from() option.....601, 989
 fv() option.....1044
 gateaux() option.....813
 geqs() option.....1045
 i() option.....655, 980, 1036,
 1037, 1044
 ip() option.....1045
 ip(f) option.....812
 ip(m) option.....602

commands, *gllamm, continued*

lf0() option.....813
 link() option...585, 807, 1036,
 1044
 link(c11) option.....872
 link(log) option.....776
 link(logit) option.....585
 link(mlogit) option..683, 684
 link(oc11) option.....681
 link(ologit) option.....655
 link(oprobit) option.....670
 link(soprobit) option....673
 lv() option.....1044
 nip() option.....585, 602, 656,
 777, 784, 813, 990
 nrf() option.....661, 733, 990,
 1036, 1037, 1044
 offset() option.....807
 peqs() option.....1038, 1045
 robust option.....579, 586, 777
 s() option.....673, 690, 1045
 skip option.....989
 thresh() option..676, 678, 684,
 691, 1038, 1045
 weight() option..602, 631, 883
 gllapred.....232, 666–667,
 747, 750, 996–997, 1039–1040,
 1053–1056
 above() option.....666
 fsample option...613, 666, 750
 linpred option.....1039
 ll option....594, 786, 875, 878
 marginal option.....750, 1039
 mu option....611, 666, 750, 808
 nooffset option.....808
 u option.....747, 1039
 ustd option.....606, 1039
 gllasim.....799, 1057–1059
 fac option.....1058
 fsample option.....800
 linpred option.....1058
 mu option.....1058
 u option.....1058
 y option.....1058

commands, *continued*

glm.....565, 644, 789
 eform option.....566, 771
 family() option.....565
 family(poisson) option...771
 link() option.....565, 771
 link(log) option.....771
 link(logit) option.....565
 link(probit) option.....566
 scale(x2) option.....789, 790
 gmm.....316, 619
 gologit2.....678
 graph combine.....228
 gsem.....681, 684, 752
 mlogit option.....752
 ocloglog option.....681
 gsort.....230
 hausman.....169, 280
 equation(1:1) option.....169
 hetoprobit.....675
 histogram.....13, 179
 normal option.....58, 228
 intreg.....919
 ivregress.....315
 keep.....253
 lfit.....203
 lincom..40, 43, 47, 172, 652, 1006
 eform option.....652
 or option.....595, 652
 small option.....156
 lnigammaden().....1011
 logit.....561, 562, 644
 coeflegend option.....564
 offset() option.....604
 or option.....562, 563, 848
 lrtest....95, 156, 406, 506, 660
 force option.....130, 219, 291,
 406, 690, 691, 728, 778
 ltable.....837
 hazard option.....837
 noadjust option.....837
 manova.....290
 margins.....19, 36, 43, 156, 157,
 565, 745
 noesample option.....746

commands, *continued*

marginsplot.....43, 158, 565
 noci option.....43
 plotlopts(lpatt(dash))
 option.....43
 recast(line) option.....43
 matrix score.....904, 913, 932
 mecloglog.....872–875
 meglm
 family(ordinal) option...681
 link(cloglog) option.....681
 melogit.....584, 1003
 binomial() option....623, 764
 coeflegend option....592, 980,
 1007
 from() option.....601
 [fweight=].....602
 fweight() option....602, 626,
 883
 intmethod(laplace) option...
 584, 599, 600, 776
 intmethod(mcaghermite)
 option.....584, 600
 intpoints() option...584, 976,
 1024
 noestimate option.....1023
 or option.....978
 pweight() option.....633
 startvalues() option.....601
 melogit
 intpoints() option...584, 600
 menbreg.....793
 dispersion(mean) option..793
 meologit
 coeflegend option.....657
 intpoints() option...654, 656
 or option.....654
 vce(cluster *clustvar*) option..
 689
 meoprobit.....669, 672
 mepoisson.....791, 939, 942
 dispersion(constant)
 option.....794
 intmethod(mcaghermite)
 option.....776

commands, *mepoisson*, *continued*

intpoints() option ... 776, 784
 irr option 775
 vce(robust) option 791
 merge 526, 604
 mestreg 940, 943, 946
 meta summarize
 common option 131
 misstable 412
 mixed 89, 216, 290, 339, 347,
 357, 439–443, 487
 coeflegend option 120
 covariance() option 339
 covariance(exchangeable) op-
 tion 480
 covariance(identity)
 option 481
 covariance(unstructured)
 option 216, 347, 459, 481
 dfmethod(kroger) option ... 92,
 152, 155
 emitrate() option ... 184, 237
 emonly option 184, 237
 estmetric option 120
 matlog option 220
 matsqrt option 219
 mle option 85, 89, 147, 214,
 290, 339
 noconstant option 89, 339,
 349, 357, 407, 481
 nofetable option 339
 nogroup option 339
 reml option ... 85, 90, 111, 124,
 185, 218
 residuals() option ... 339, 418
 residuals(ar 1, t() by())
 option 362
 residuals(ar 1, t())
 option 349, 357
 residuals(banded 1, t())
 option 354
 residuals(exchangeable)
 option 344
 residuals(exponential,
 t()) option 351

commands, *mixed*, *continued*

residuals(independent,
 by()) option ... 358, 360, 405,
 418
 residuals(ma 1, t())
 option 352
 residuals(toeplitz 2, t())
 option 355
 residuals(unstructured,
 t()) option 339
 stddeviations option ... 89, 90,
 217, 341, 440
 technique() option 184
 variance option 217
 vce(robust) option ... 90, 93,
 147, 214, 290, 367, 368
 mixlogit 728
 mkspline 400, 912
 knots() option 912
 mlogit ... 683, 696, 701, 703, 704,
 858
 rrr option 703, 858
 mprobit 752
 nbreg 787
 dispersion(constant)
 option 788
 dispersion(mean) option .. 787
 oglm 681
 ologit 644, 651
 or option 651
 vce() option 651
 oprobit 644
 poisson 769, 790, 906, 932
 irr option 769, 906
 offset() option 906
 pr(0) option 786
 vce(cluster *clustvar*) option ..
 932
 power 189
 cluster option 189
 predict ... 26, 224, 226, 442, 563,
 609, 842, 991, 993–995
 conditional(ebmeans)
 option 611

commands, predict, *continued*

conditional(ebmodes)
 option 617
 ebmeans option ... 605, 607, 991
 ebmodal option 607
 ebmodes option 993
 fitted option 226, 396, 464
 fixedonly option 995
 marginal option 608, 994
 mu option 608, 611, 617
 pr option 563, 608, 653, 842
 reffects option .. 122, 179, 224,
 442, 462, 491, 605, 606, 991,
 993
 ebmodes option 606, 607
 reses() option ... 123, 124, 179,
 425, 605, 607, 993, 994
 rstandard option .. 58, 179, 229
 xb option 26, 114, 202, 466,
 609
 probit 644
 qnorm 508
 rcap 231
 recode 433, 645
 regress 23, 87, 181, 202
 beta option 26
 coeflegend option 43
 noconstant option 115
 nofvlabel option 43, 52
 vce() option 195
 vce(cluster *clustvar*) option ..
 181
 vce(robust) option 29, 59
 reshape ... 86, 252, 266, 417, 433,
 526, 850
 i() option 86, 253, 433, 691
 j() option 86, 253
 string option 330, 433
 rologit 752
 sem 411
 means() option 414
 method(mlmv) option 414
 noconstant option 414
 set matsize 797
 set seed 319, 800

commands, *continued*

slogit 684
 ssc 511, 585
 replace option 585
 startvalues(constantonly)
 1031
 statsby 205, 223, 526, 604
 stcox
 efron option 908
 exactm option 908
 exactp option 908
 frailty(gamma) option 935
 shared() option 935
 strata() option .. 924, 930, 950
 texp() option 923
 tvc() option 923
 vce(cluster *clustvar*) option ..
 928
 stcurve 909, 918
 addplot() option 966
 at() option 909
 hazard option 909, 918
 outfile() option 909
 unconditional option 945
 stintreg 919, 920
 distribution(lognormal)
 option 920
 stjoin 906, 914
 streg 896, 897, 900, 914, 915,
 917
 distribution(exponential)
 option 906
 distribution(lognormal)
 option 917, 944
 frailty(gamma) option 944
 shared() option 944
 time option 916, 917
 tr option 918, 923
 sts graph 893
 hazard option 894
 stset 830, 921, 954
 enter() option ... 830, 892, 957
 failure() option 921
 id() option 921, 925, 951

commands, *stset*, *continued*

origin() option...830, 892, 958,
 959
 summarize.....206
 supclust.....511
 svmat.....815
 svyset.....102
 table.....646, 900
 tabstat.....12, 266
 tabulate.....44, 496, 840
 generate() option.....44
 test.....678
 testparm.....48, 49, 155, 175
 small option.....155
 tobit.....919
 ttest.....15
 unequal option.....16, 29
 twoway
 by() option.....193
 connect(ascending) option ...
 193, 207, 261
 connect(stairstep) option ...
 844
 ysize() option.....231
 twoway function...40, 221, 564
 twoway histogram
 horizontal option.....228
 use.....77
 clear option.....12, 77
 xtabond.....316
 xtcloglog.....872
 xtdescribe...256, 417, 448, 526,
 571, 572, 646, 767
 xtddidregress.....287
 xtgee.....368, 620, 798
 corr(ar 1) option.....368
 corr(exchangeable) option ...
 620
 eform option.....620, 798
 vce(robust) option ...368, 620
 xtglsl.....371, 381
 igls option.....371
 xthtaylor.....297
 amacurdy option.....297, 332
 endog() option.....297

commands, *continued*

xtivreg.....303, 305
 ec2sls option.....305
 fe option.....303
 re option.....305
 xtlogit.....580–582
 fe option.....618
 or option.....581
 xtmixed.....76
 xtmlogit.....752
 fe option.....752
 re option.....752
 xtnbreg.....794
 xtpcse.....372, 380
 correlation(ar1) option...373,
 380
 correlation(independent) op-
 tion.....380
 independent option.....380
 nmk option.....380
 xtprdyn.....623
 xtppoisson
 coeflegend option.....775
 fe option.....796, 911
 irr option.....911, 940
 normal option.....773
 offset() option.....911
 vce(robust) option.....774
 xtreg.....87, 144, 160, 272–278
 be option.....160
 fe option....99, 111, 163, 275,
 301, 329
 mle option.....85, 87
 pa option.....369
 re option...85, 88, 96, 164, 183,
 195
 sa option.....183
 vce(robust) option....88, 93,
 369
 xtrho.....593
 detail option.....593
 xtrhoi.....593
 xtset.....87, 135, 255, 327, 646
 xtsum.....135, 450, 526, 571

commands, *continued*

`xttab` 137, 258, 571
`xttest0` 97
 comparative standard error ... 123, 605
 competing risks 855–860, 959
 complementary log–log link 681
 complementary log–log model 865–866
 complex level-1 variation 405
 compositional effect 167, 191
 compound symmetric structure 344
 compound symmetry 344
 conditional
 independence 81
 logistic regression 617–619
 logit model 705–715
 negative binomial regression... 797
 Poisson regression 794–797
 confidence interval 16, 91–100, 156–158
 confounder 30
 consistent estimator 107
 contextual effect 167, 191
 continuation-ratio logit model 681, 847
 continuous-time survival .. 833, 887–967
 contrast 156
 counting-process risk interval .. 956–958
 counts 763–825
 covariance structure 107, 333–363, 487
 covariate 35
 Cox regression 906–914
 cross-classification 483, 493, 971
 cross-level interaction 234, 404, 988
 cross-over trial 6
 cross-sectional time-series data 249
 crossed random effects 483–523, 1000–1026
 crossover trial 818
 cumulative hazard function 890
 cumulative model 635–644
 current status data 832

D

datasets see applications
 de-meaning 275–278
 delayed entry 830, 832, 860, 890
 design effect 186
 diagnostic standard error 123
 diagnostics 178–181, 507–509
 dichotomous response 557–634
 difference estimator 274, 282
 difference-in-differences .. 284–290, 326, 771
 directed acyclic graph 80, 81
 discrete choice 695–759
 discrete-time
 hazard 835–838
 survival 833, 835–886
 discrimination parameter 676
 disease mapping 803
 double differencing 293
 dropout 318, 768
 dummy variable 27–30, 44–50
 dynamic model 250–251, 308–312

E

EB see empirical Bayes
 ecological fallacy 1, 166
 effect modifier see interaction
 effective sample size 1014
 efficiency 107
 elasticity 307, 329, 381, 822
 EM algorithm 183
 empirical Bayes 116–122, 177–179, 224–227, 396, 416, 442–443, 462, 491, 507, 604–606, 808
 borrowing strength 119
 modal 606
 standard errors 122–125
 endogeneity 139, 165–175, 269–299
 equally spaced occasions 256
 error components 82
 estimated best linear unbiased predictor 119
 examples see applications
 exchangeable 103

exchangeable structure 344, 620
 exogeneity 60, 139
 exponential family 1036
 exponential structure 348–351
 exposure 765

F

factor 35, 102
 loading 676
 factor variables . . 36, 41, 46, 52, 54, 56,
 106, 115, 234
 family study 5
 feasible generalized least squares . . 164,
 182
 FGLS see feasible generalized least
 squares
 first-differencing 282–284
 fixed effects 102–104, 176–178
 fixed-effects estimator 162–164,
 274–282, 617–619, 794–797
 fixed-effects logistic regression 617
 fixed-effects model 162, 250
 fixed-occasion data 335
 fixed occasions 256
 fixed part 1036
 frailty 772, 934, 945
 functions
 invlogit() 564
 invnormal() 568
 rnormal() 319
 runiform() 320

G

gap-time risk interval 958–959
 Gâteaux derivative 813
 Gaussian quadrature see adaptive
 quadrature
 GEE see generalized estimating
 equations
 generalizability
 coefficient 516
 theory 516
 generalized
 estimating equations 575,
 619–622, 797–798

generalized, *continued*

 least squares 181
 linear mixed model 577
 linear model 558–560, 636
 method of moments 619
 GLM see generalized linear model
 GLMM see generalized linear mixed
 model
 GLS see generalized least squares
 grouped-time survival data 832
 growth-curve model 387–428

H

Hammersley sequence 726
 Hausman–Taylor estimator 294–299
 Hausman test . . 168, 279–282, 306–308,
 332
 hazard function 890
 hazard ratio 895
 Hessian 183
 heteroskedasticity 21, 211, 358–362,
 405–408, 672
 HHG model 794
 hierarchical data 431
 hierarchical model 101
 hierarchical prior 1010
 higher-level model . . 431–482, 971–1034
 higher-order polynomials 57
 homoskedasticity 21, 672
 How many clusters? 94
 hyperparameters 1009
 hypothesis test 12–
 17, 91–100, 152–156, 158–159,
 219, 363, 444, 505–507

I

identification 237–238, 642–644
 incidence rate 890
 incidence-rate ratio 766, 895
 independence from irrelevant
 alternatives 715–716
 independence structure 337, 620
 independent censoring 831
 independent-samples *t* test 12–17
 index function 567

indicator variable..see dummy variable
 indicators.....41
 information matrix.....183
 initial-conditions problem.....313
 instrumental variable.....178, 295, 296
 integrated hazard function.....890
 intensity.....765
 intensity function.....890
 interaction.....38–44, 50–54
 intercept.....21
 intermittent missingness.....572
 interval-censoring.....832, 864–865
 intervening variable.....50
 intraclass correlation.....83, 141, 212,
 438–439, 486, 501
 inverse link function.....558
 IRR.....see incidence-rate ratio
 item response theory.....603
 iterative generalized least squares..183

K

Kaplan–Meier estimator.....893
 Kenward–Roger method.....92
 Kish factor.....186

L

lagged-response model.....308–312
 Laplace approximation.....584, 1003
 latent response model.....566–569,
 637–640, 974
 latent trajectory model.....see
 growth-curve model
 latent variable.....409
 left-censoring.....832
 left-truncation.....832, 860–861
 level-1 weights.....631, 633
 level-2 frequency weights.....626
 level-2 weights.....633
 Lexis diagram.....262
 likelihood-ratio test....95–96, 155, 943
 linear mixed (effects) model.....138
 linear predictor.....558, 1036
 linear projection.....60
 linear random-intercept model with co-
 variates.....138

linear regression.....see simple linear
 regression
 link function.....558, 1036
 log-linear model.....765
 log link.....766
 log-normal model.....916–920
 log odds.....see logit link
 logistic regression.....561–566, 568
 logit link.....558
 long form.....86, 252–254
 long panel.....369–374
 longitudinal correlations.....267
 longitudinal data.....249, 269–332,
 387–428
 longitudinal model.....1–7
 longitudinal study.....5–6
 Lord’s paradox.....288

M

MANOVA...see multivariate analysis of
 variance
 MAR.....see missing at random
 marginal
 effect.....560, 587, 652
 likelihood.....109
 model.....251, 333–385
 probability.....573, 586, 662
 variance.....590
 Markov chain Monte Carlo.....1010
 maximum likelihood.....108, 183,
 596–602
 MCAR.....see missing completely at
 random
 MCMC...see Markov chain Monte Carlo
 mean squared error of prediction...123
 mean structure.....333
 measurement error.....80
 measurement model.....80, 670
 measurement study..6, 76–77, 432–433
 median hazard ratio.....940
 median incidence-rate ratio.....940
 median odds ratio.....657
 mediator.....see intervening variable
 meta-analysis.....4–5

- missing
 at random.....318, 799
 completely at random.....799
 data.....256–257, 318–322, 572,
 799–803
 mixed model.....138
 mixed-effects model.....89
 ML.....see maximum likelihood
 model-based estimator.....29
 model sum of squares.....17
 moderator.....see interaction
 monotone missingness.....572
 moving-average structure.....351–353
 multilevel model.....1–7
 multinomial logit model.....696–704
 multiple absorbing events.....855–860
 multiple linear regression.....30–38
 multiple membership model...513, 523
 multisite trials.....190
 multistage survey.....3–4, 688, 692
 multivariate
 analysis of variance.....290
 multilevel model.....476
 regression model.....343
 response.....409
 Mundlak approach.....280–282
- N**
 negative binomial model.....786–788
 nested random effects.....431–482,
 971–1034
 Newton–Raphson algorithm.....183
 Nickell bias.....314
 NMAR.....see not missing at random
 nominal response.....695–759
 nonparametric maximum likelihood ...
 811–816, 1045
 nonresponse.....768
 normality assumption.....14, 108, 140,
 210, 338
 normalizing constant.....1008
 not missing at random.....319
 NPML....see nonparametric maximum
 likelihood
- O**
 odds.....558
 odds ratio.....559
 offset.....603, 766, 807, 819
 OLS.....see ordinary least squares
 one-way ANOVA.....17–19
 ordinal
 logit model.....636
 probit model.....636
 response.....635–693
 ordinary least squares.....17, 185
 overdispersion.....766, 773, 784–790
 overparameterized.....20
- P**
 panel data.....see longitudinal data
 parallel-regressions assumption....636,
 678
 partial effect.....560
 partial likelihood.....907–908
 partial log likelihood.....908
 partial pooling.....119
 path diagram....80, 81, 296, 348, 351,
 411, 437, 480
 person–period data.....840
 piecewise exponential model...897–906
 piecewise linear model.....398–403
 Poisson
 distribution.....763
 model.....765–766
 regression.....768–771, 806
 polynomial.....54–57, 389–390
 pooled OLS.....181, 264–265
 population averaged.....see marginal
 probability
 posterior
 distribution.....116, 1007
 variance.....122
 posterior predictive probabilities...611
 power.....186–190
 predicted probabilities.....609–617
 prediction.....see empirical Bayes
 predictive margin.....37
 preference heterogeneity.....724–735
 prefix command.....1011

- prior distribution 116, 1007
- probit
 link 558
 regression 568–571
- product-limit estimator 893
- profile likelihood 908
- proportional
 hazards 864–865
 hazards model 895–914
 odds model 641–642, 650–654,
 847
- pseudolikelihood 632
- Q**
- quadrature see adaptive quadrature
- quasilikelihood 788–790
- R**
- random
 coefficient 1036
 effects 102–104, 176–181, 1036
 interaction 505
 intercept 80, 1036
 slope 1036
- random-coefficient
 logistic regression 984–993
 model 208–214
 Poisson regression 778–784
 proportional-odds model 658–661
- random-effects model 250
- random-intercept
 logistic regression 577–586,
 973–983
 model 138–144
 ordinal probit model 670–681
 Poisson regression 772–778,
 806–811
 proportional-odds model 654–657
- rankings 752
- Rasch model 628, 1032
- recurrent-event data 834, 951–959
- reduced form 233, 404
- reference group 28
- regression coefficient 21
- regression sum of squares see model
 sum of squares
- regression to the mean 288
- reliability 82
- REML see restricted maximum
 likelihood
- repeated measures see longitudinal
 data, 249
- repeated-measures analysis of variance
 288–290
- residual sum of squares see sum of
 squared errors
- residuals 58–59, 178–181, 227–229,
 462–466, 507–509
- response heterogeneity 735–751
- restricted maximum likelihood 184
- right-censoring 831
- right-truncation 832
- risk set 837
- robust standard error 29,
 59, 93, 108, 112, 147, 186, 214,
 265, 267, 368, 595
- R*-squared see coefficient of
 determination
- S**
- sample-size determination 186–190
- sampling the inflow 860
- sandwich estimator 29, 93, 112, 265,
 368, 620
- scalars 395
- scaled probit link 673
- scatterplot 202
- score test 96
- secular trends 771
- seemingly unrelated regression 343,
 382
- SEM see structural equation model
- sequential logit model 847
- serial correlations 267
- set seed 259
- short panel 369–374
- shrinkage 119, 224, 810
- shrinkage factor 119
- simple linear regression 19–27

simulated maximum likelihood 726
 simulation 319–322, 799–803
 slope 21
 small-area estimation 198, 803
 SML see simulated maximum
 likelihood
 spaghetti plot 207
 speed 599
 spherical quadrature 602
 sphericity 289
 spline 398
 split-plot design 290
 spurious state dependence 310
 SSC 511
 standardized mortality ratio 804
 standardized regression coefficient 26
 state dependence 312
 stated preference data 754
 stationary 1010
 stereotype model 684
 stock sample 860
 string variable 433
 structural equation model 409–411
 subject-specific effect 269–332, 586
 subject-specific probability 662
 sum of squared errors 17
 survey weights 632
 survival function 838, 890

T

three-level model 431, 435–466,
 973–993
 three-stage formulation 454–455
 three-way interaction 44
 ties 907–908
 time scales 262–264
 time-series operators 315
 time-series–cross-sectional data 369–
 374
 time-varying covariates 257–258, 833,
 849–854, 920–924
 Toeplitz structure 353–356
 total sum of squares 17
 total-time risk interval 952–956
 trellis graph 203, 396

truncation 831–832
t test see independent-samples *t* test
 twin study 5
 two-level model 80
 two-stage formulation 232, 403, 578
 two-way error-components model 483,
 485–493
 two-way interactions 44

U

unconditional model 149
 underdispersion 766
 unstructured covariance matrix 339–
 343
 utility 567
 utility maximization 716–718

V

variance components 82–85
 variance function 559, 619, 766, 789

W

Wald test 155, 175
 White information matrix test 367
 wide form 86, 252–254
 within estimator 162–164