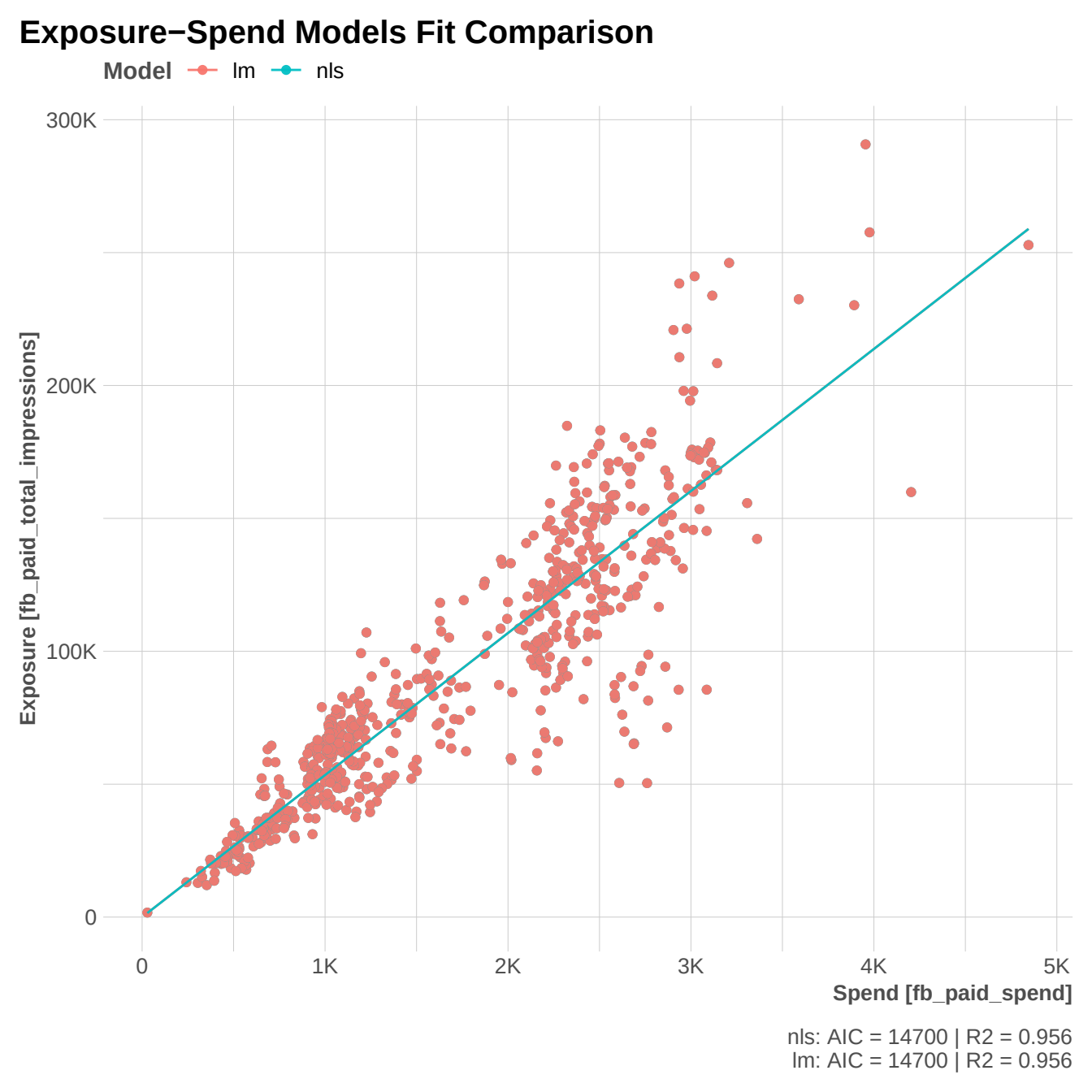
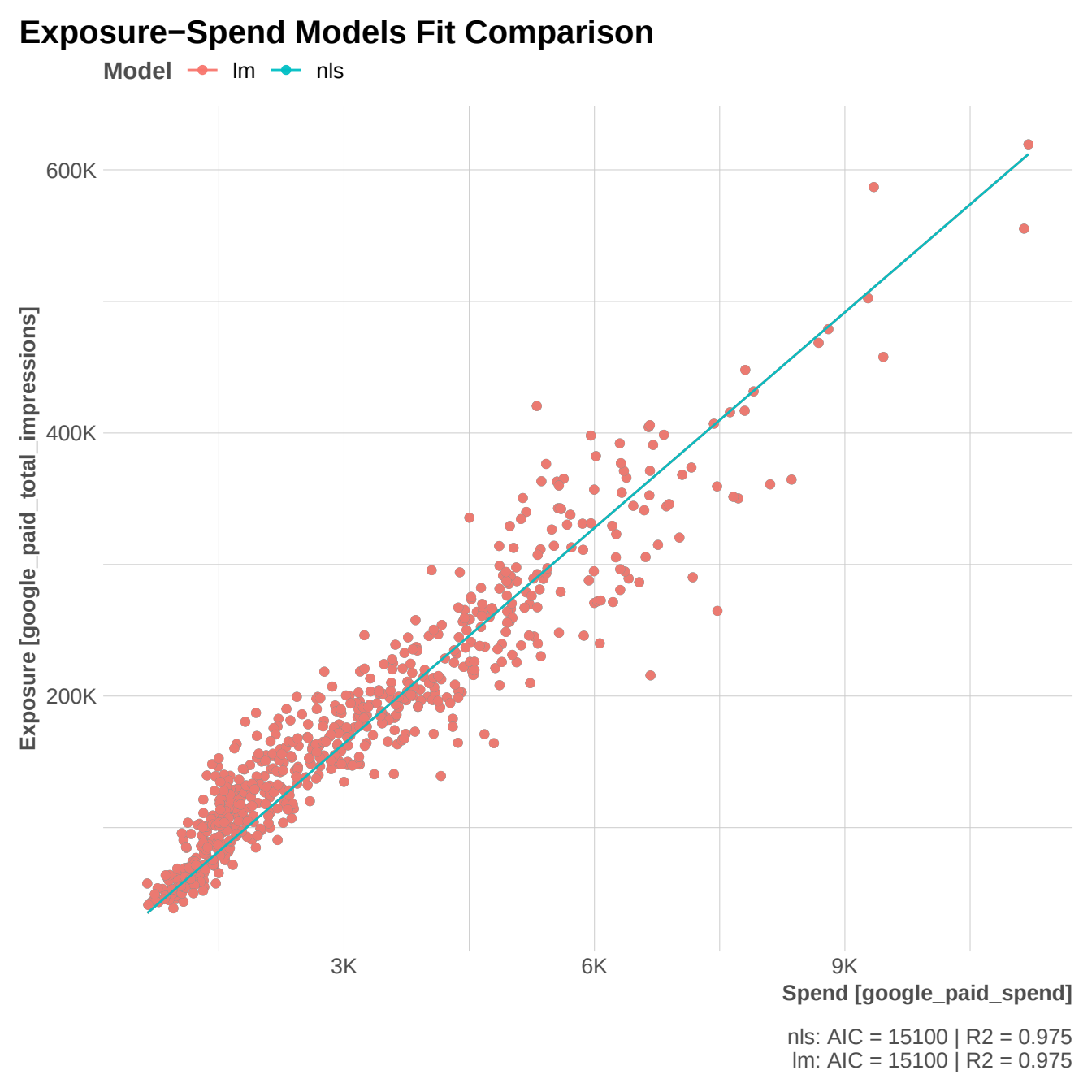
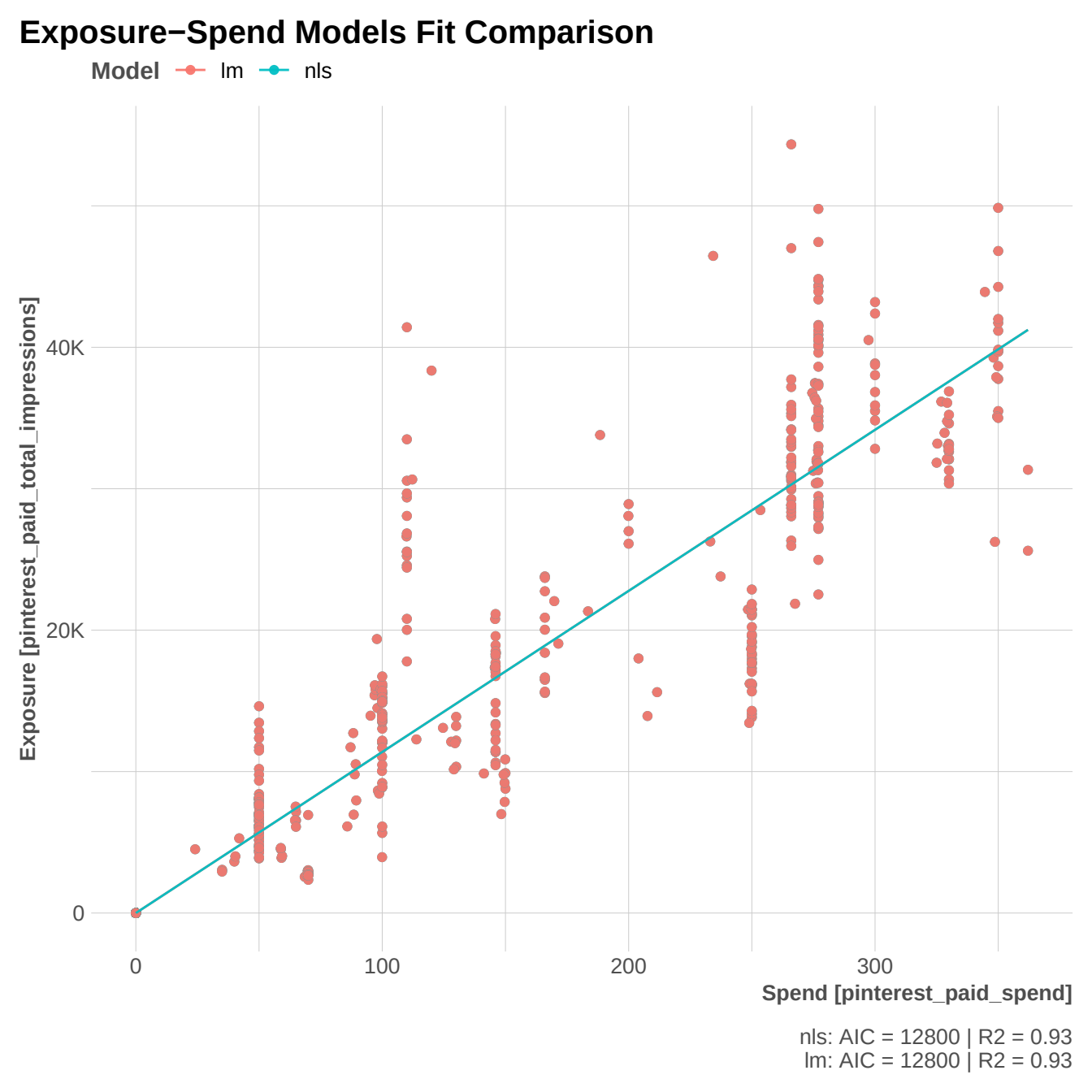
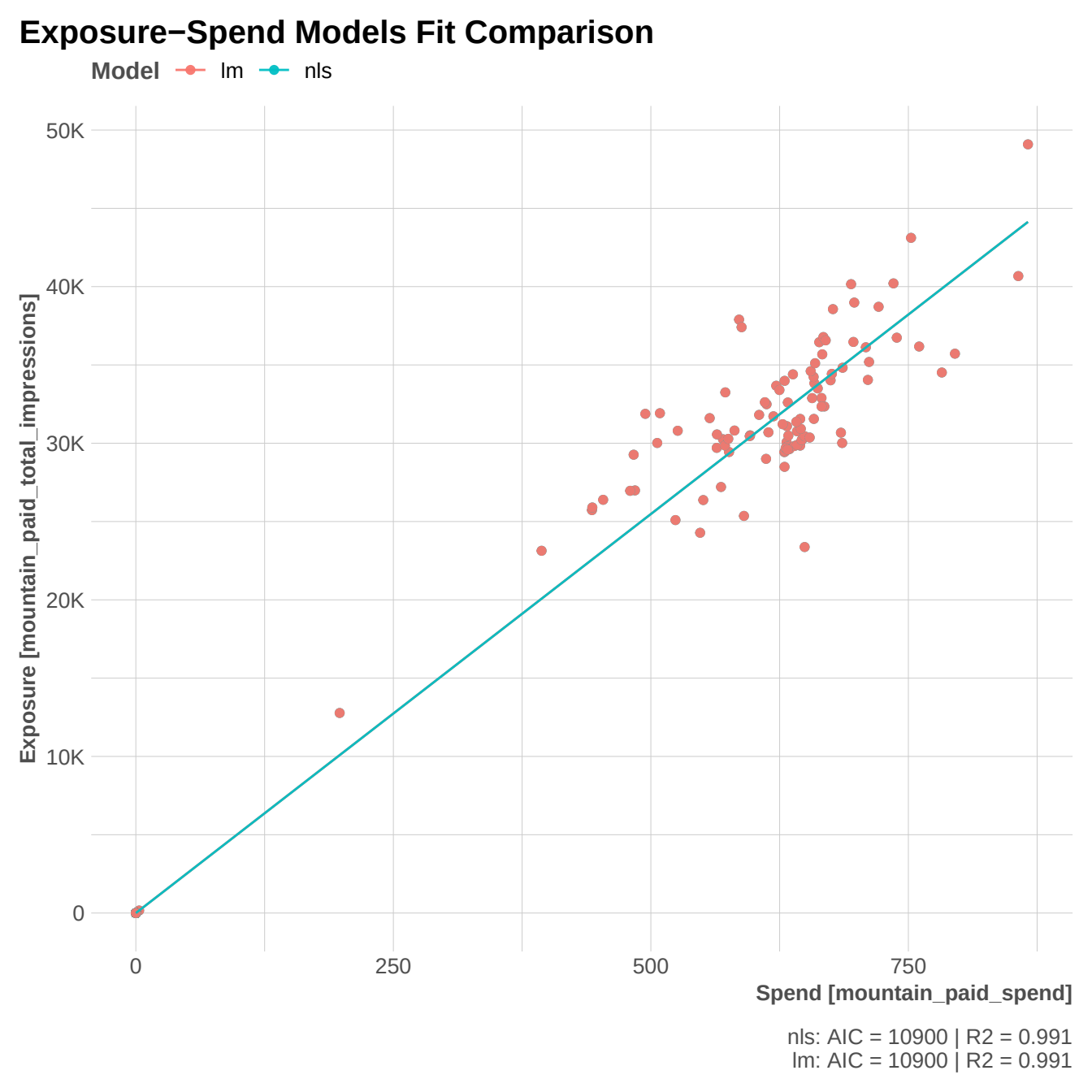
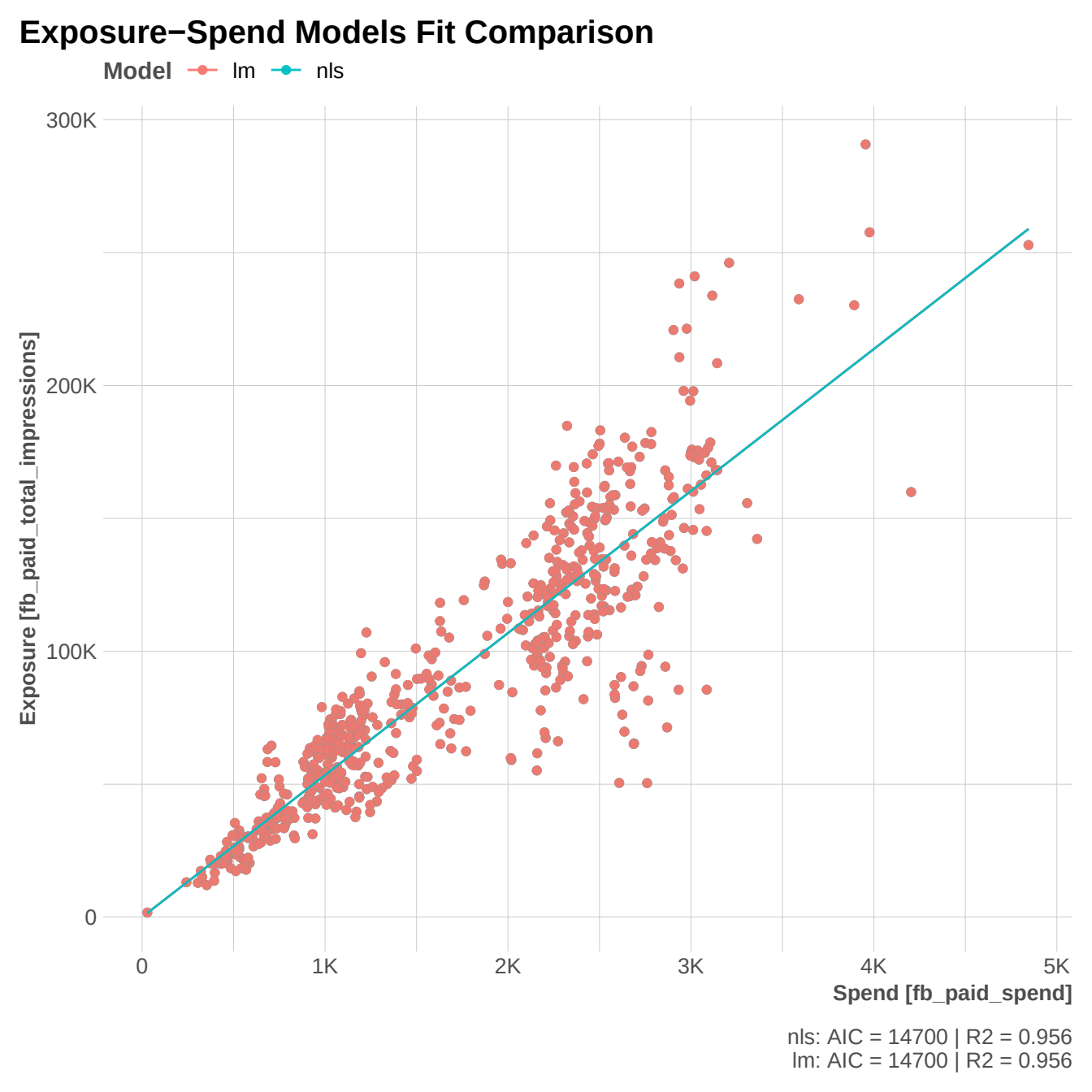
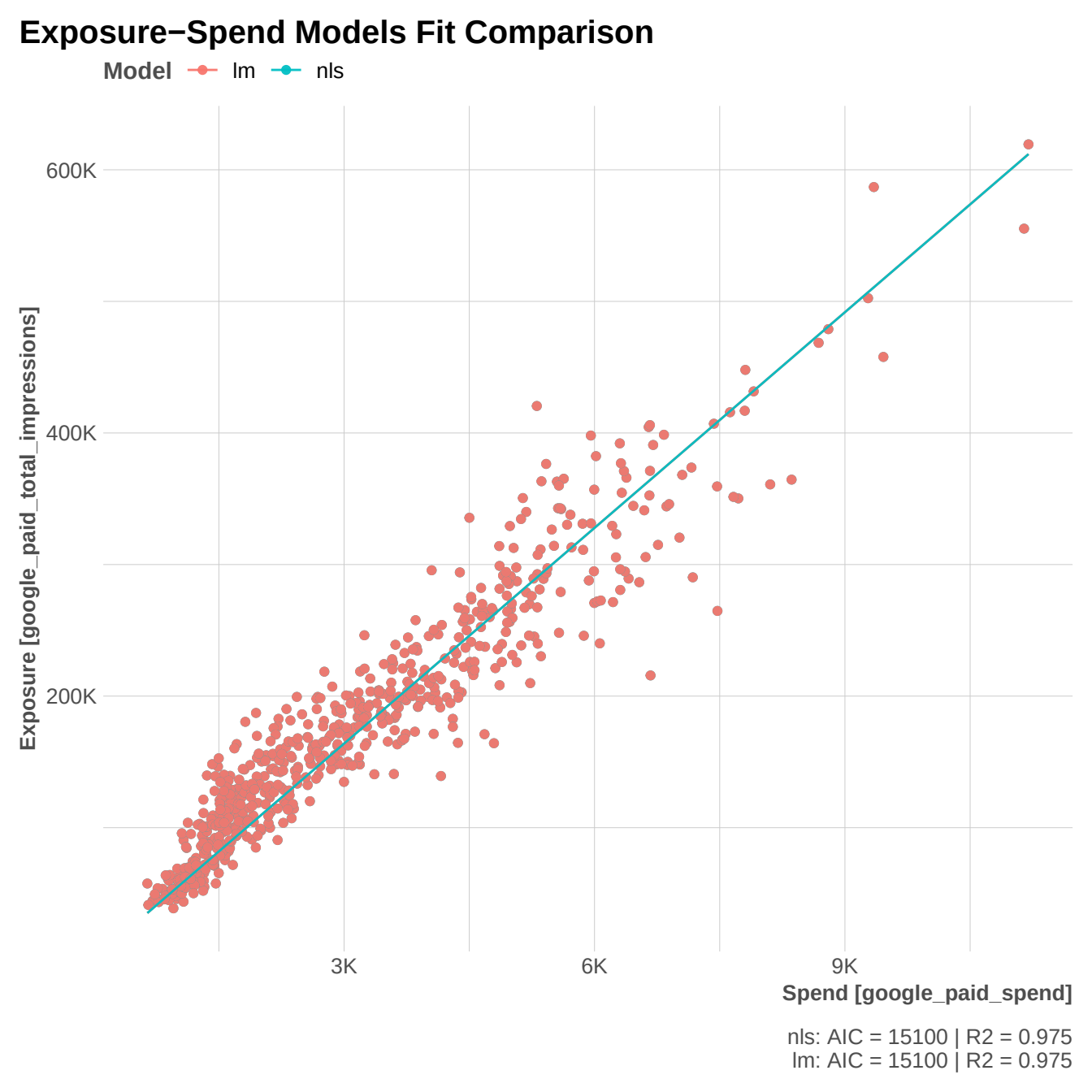

Exposure−Spend Models Fit Comparison
Model
lm
nls
300K
200K
100K
0
Exposure [fb_paid_total_impressions]
0
1K
2K
3K
4K
5K
Spend [fb_paid_spend]
nls: AIC = 14700 | R2 = 0.956
lm: AIC = 14700 | R2 = 0.956

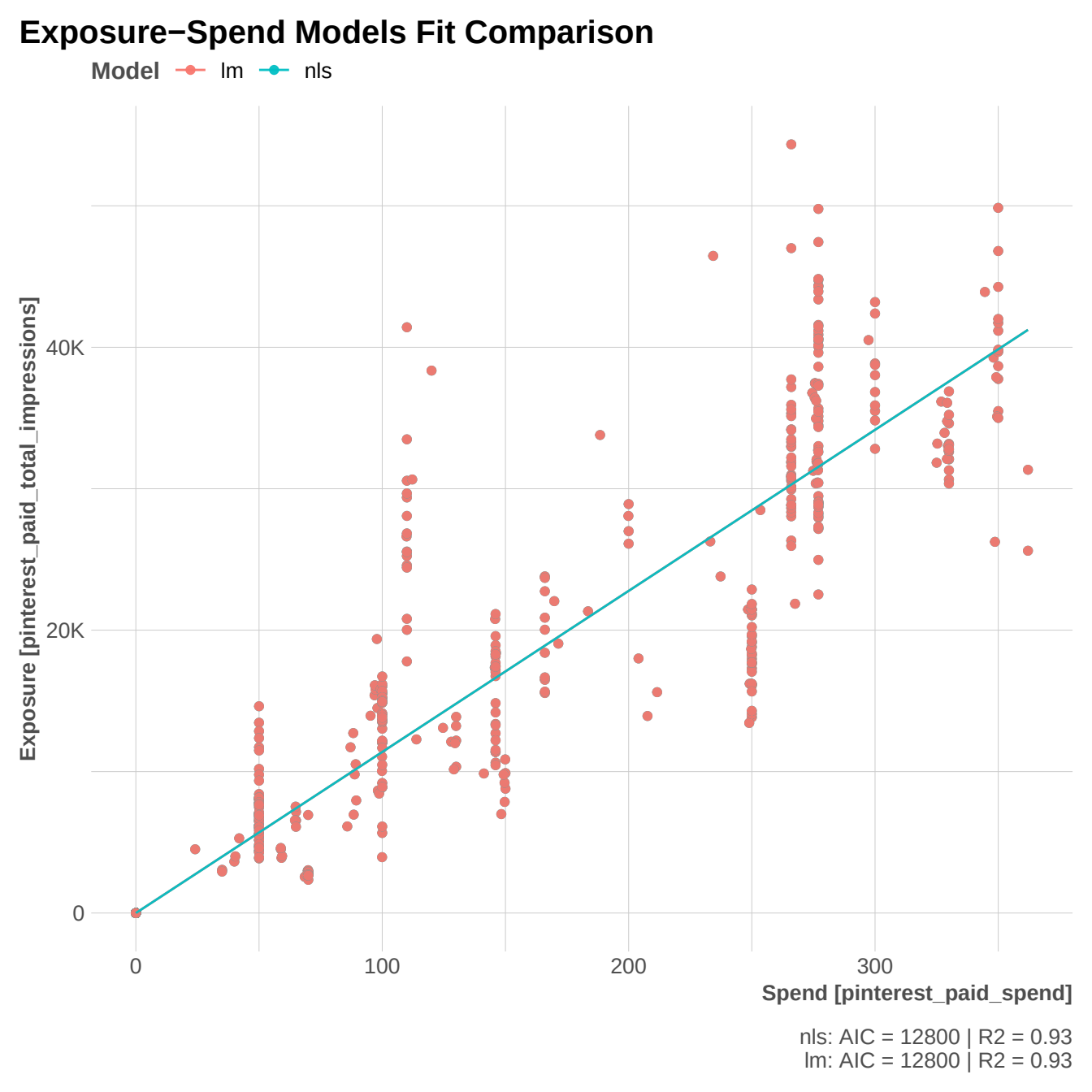

Exposure−Spend Models Fit Comparison
Model
lm
nls
600K
400K
200K
Exposure [google_paid_total_impressions]
3K
6K
9K
Spend [google_paid_spend]
nls: AIC = 15100 | R2 = 0.975
lm: AIC = 15100 | R2 = 0.975

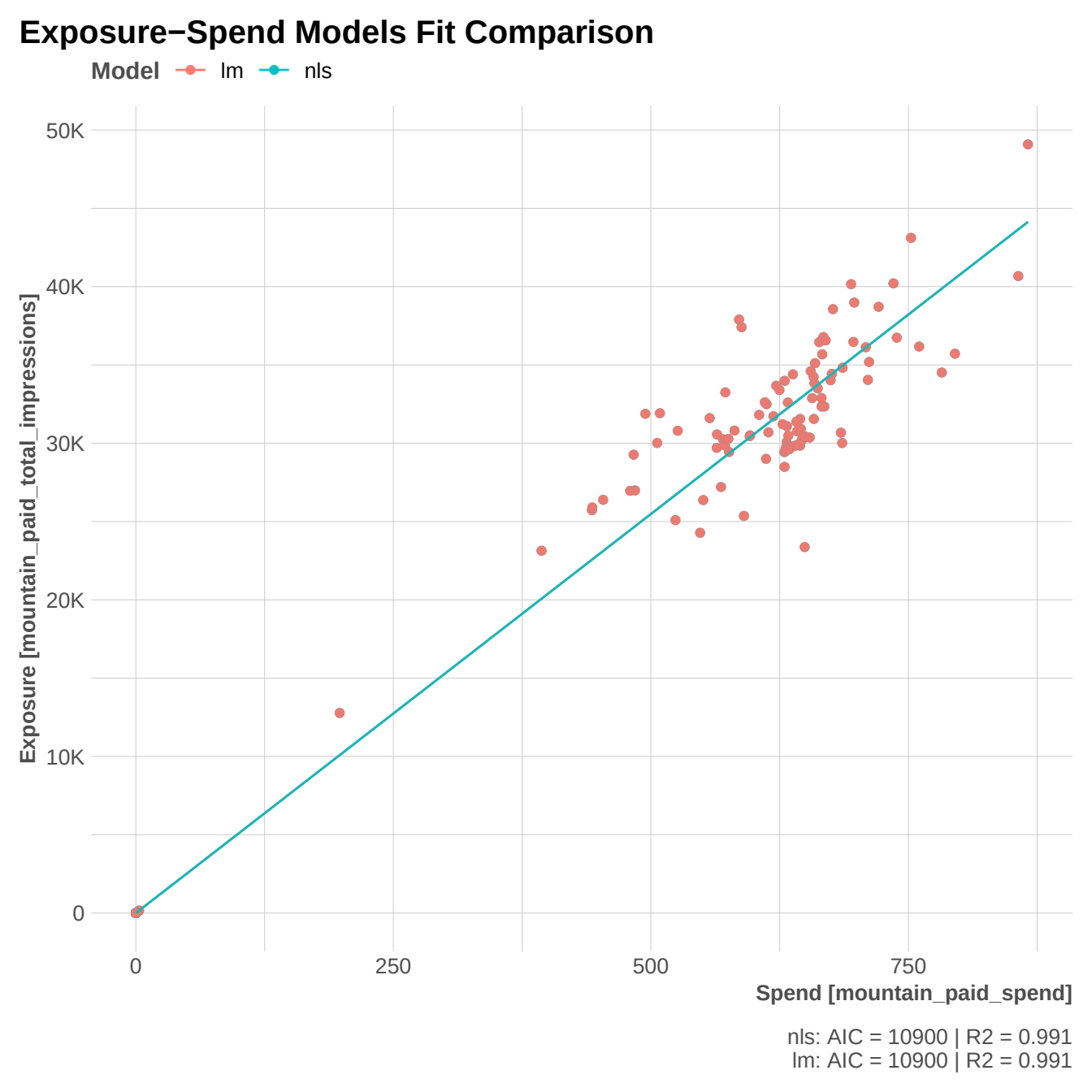

Exposure−Spend Models Fit Comparison
Model
lm
nls
Exposure [pinterest_paid_total_impressions]
40K
20K
0
0
100
200
300
Spend [pinterest_paid_spend]
nls: AIC = 12800 | R2 = 0.93
lm: AIC = 12800 | R2 = 0.93


Exposure−Spend Models Fit Comparison
Model
lm
nls
50K
40K
30K
20K
10K
0
Exposure [mountain_paid_total_impressions]
0
250
500
750
Spend [mountain_paid_spend]
nls: AIC = 10900 | R2 = 0.991
lm: AIC = 10900 | R2 = 0.991


Exposure−Spend Models Fit Comparison
Model
lm
nls
300K
200K
100K
0
Exposure [fb_paid_total_impressions]
0
1K
2K
3K
4K
5K
Spend [fb_paid_spend]
nls: AIC = 14700 | R2 = 0.956
lm: AIC = 14700 | R2 = 0.956

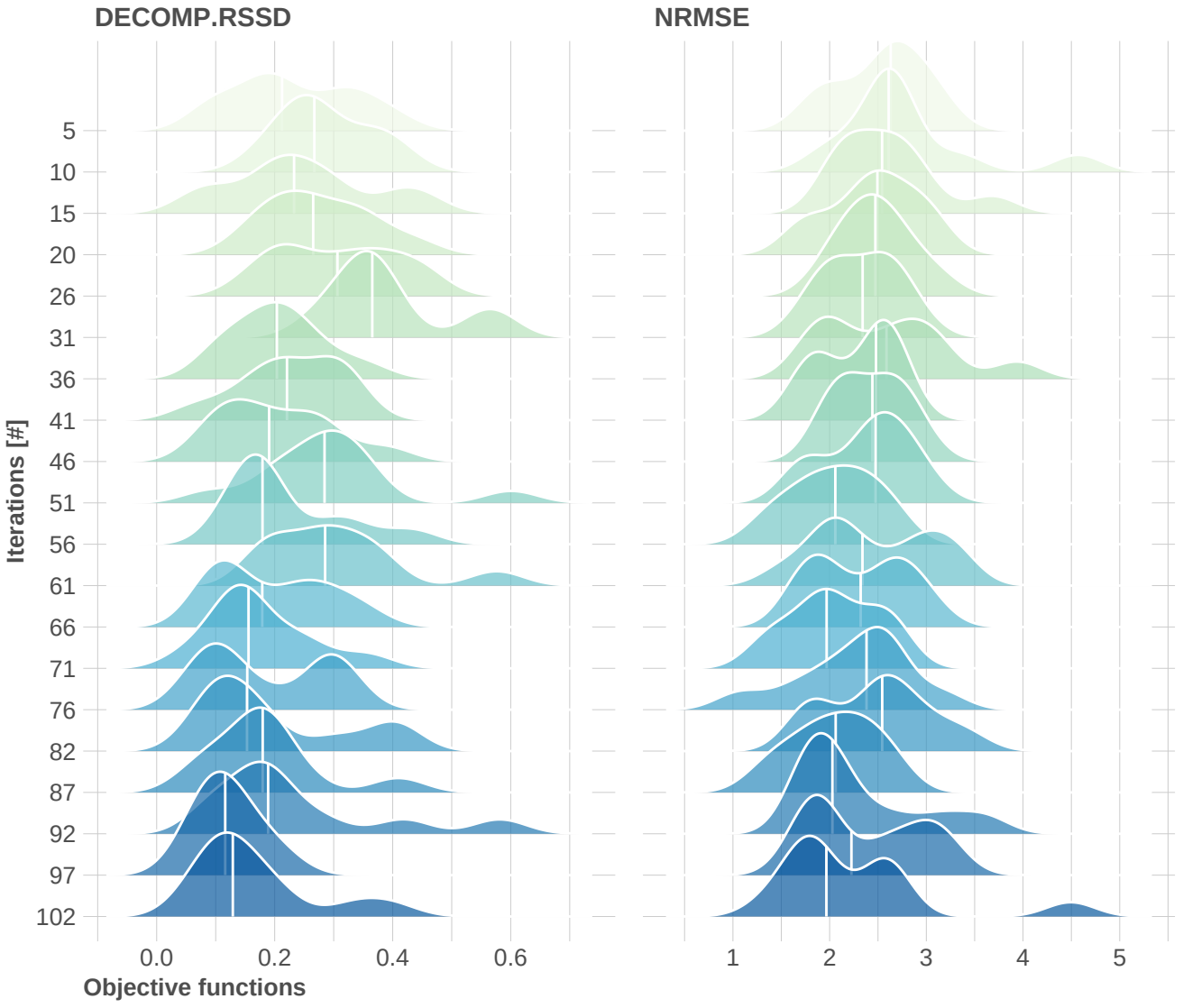

Exposure−Spend Models Fit Comparison
Model
lm
nls
600K
400K
200K
Exposure [google_paid_total_impressions]
3K
6K
9K
Spend [google_paid_spend]
nls: AIC = 15100 | R2 = 0.975
lm: AIC = 15100 | R2 = 0.975


Exposure−Spend Models Fit Comparison
Model
lm
nls
Exposure [pinterest_paid_total_impressions]
40K
20K
0
0
100
200
300
Spend [pinterest_paid_spend]
nls: AIC = 12800 | R2 = 0.93
lm: AIC = 12800 | R2 = 0.93


Exposure−Spend Models Fit Comparison
Model
lm
nls
50K
40K
30K
20K
10K
0
Exposure [mountain_paid_total_impressions]
0
250
500
750
Spend [mountain_paid_spend]
nls: AIC = 10900 | R2 = 0.991
lm: AIC = 10900 | R2 = 0.991

Objective convergence by iterations quantiles

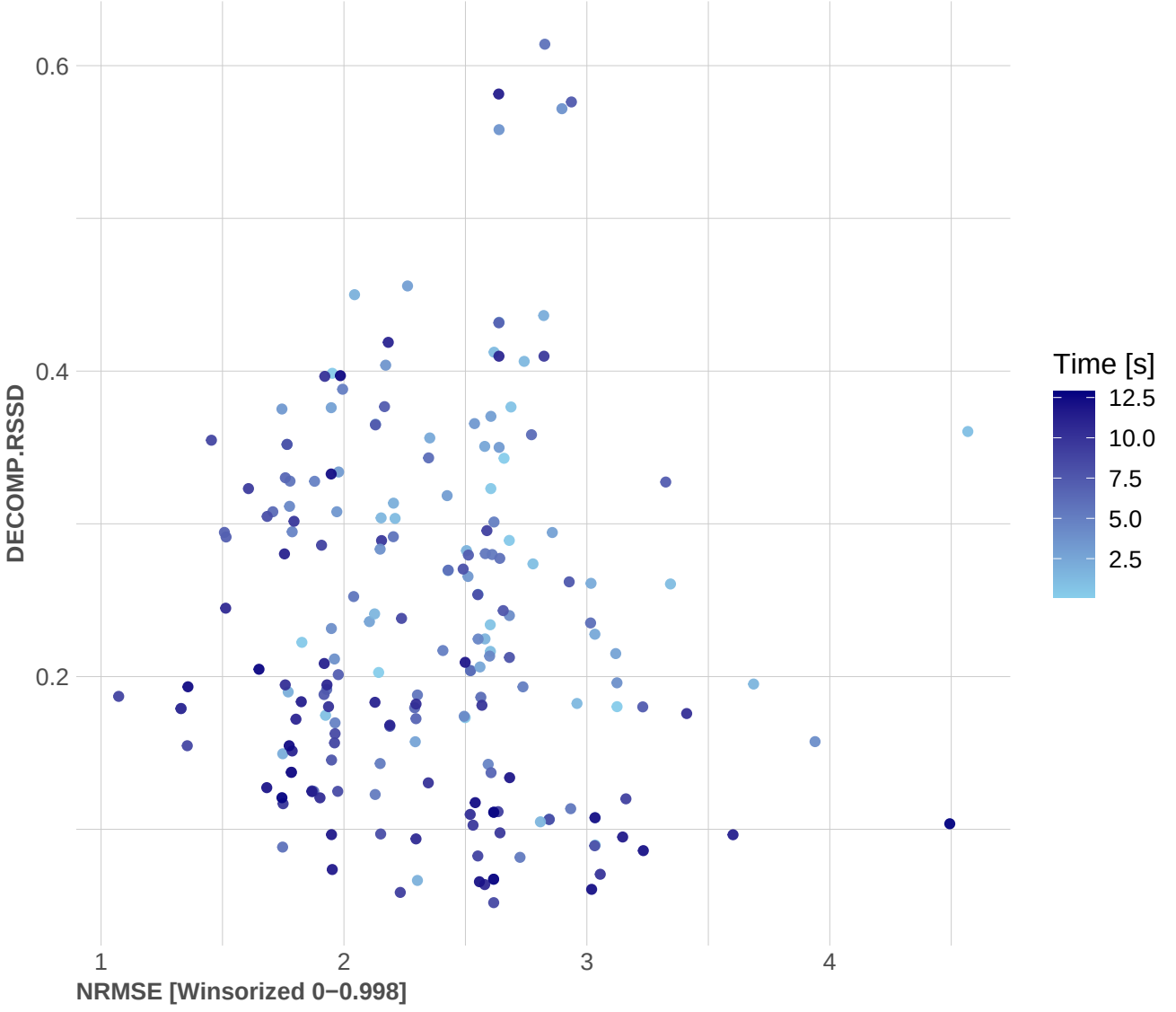
2 trials with 102 iterations each using TwoPointsDE



DECOMP.RSSD NOT converged: sd@qt.20 0.1 > 0.1 & |med@qt.20| 0.13 > 0.013
NRMSE NOT converged: sd@qt.20 0.83 > 0.56 & |med@qt.20| 2 > 1.5

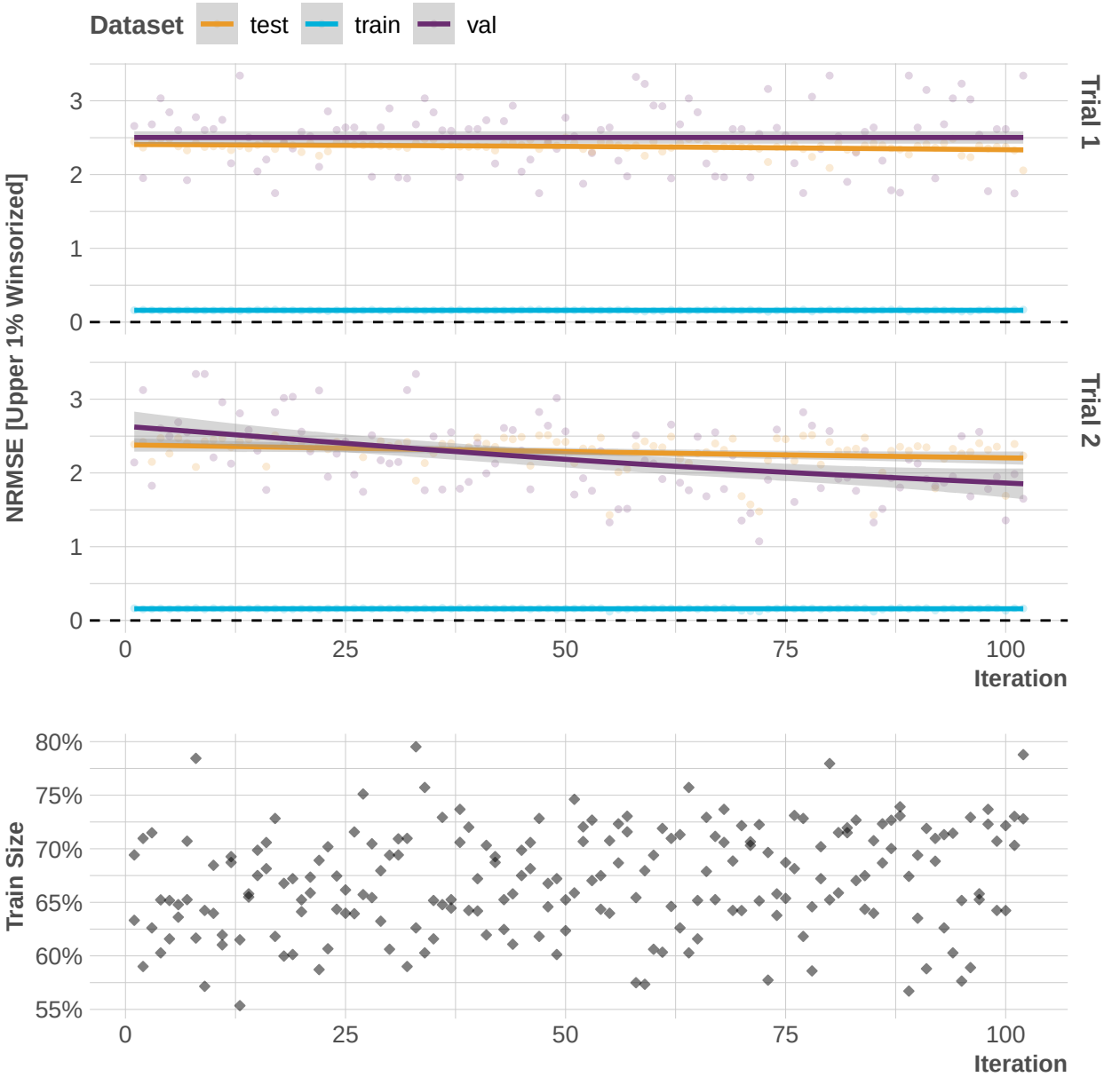
Multi−objective evolutionary performance

2 trials with 102 iterations each using TwoPointsDE



DECOMP.RSSD NOT converged: sd@qt.20 0.1 > 0.1 & |med@qt.20| 0.13 > 0.013
NRMSE NOT converged: sd@qt.20 0.83 > 0.56 & |med@qt.20| 2 > 1.5

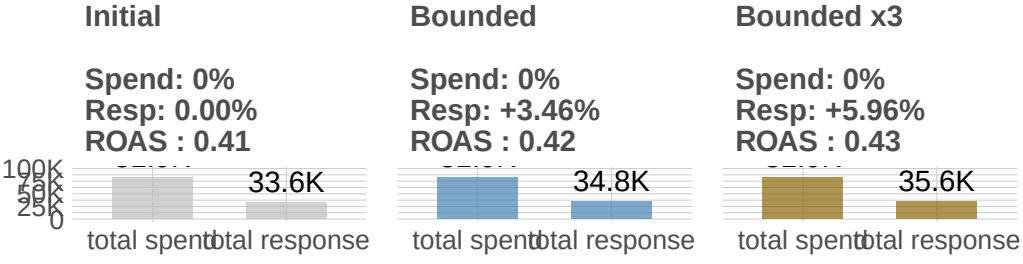
Time−series validation & Convergence



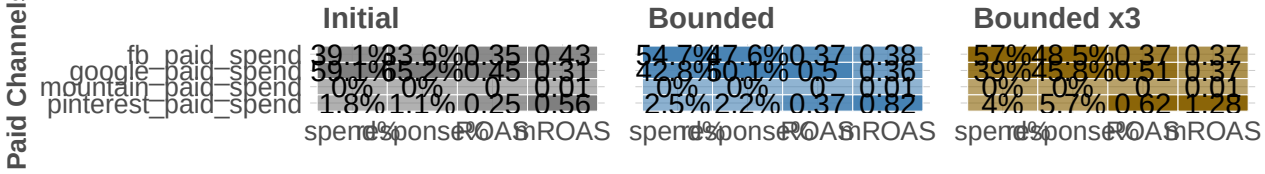
Budget Allocation Onepager for Model ID 1_92_1

Adj.R2: train = 0.0775, val = 0.0863, test = −0.8987 | NRMSE: train = 0.166, val = 1.9
Simulation date range: 2023−12−31 to 2024−01−29 (30 days) | Scenario: max_respo

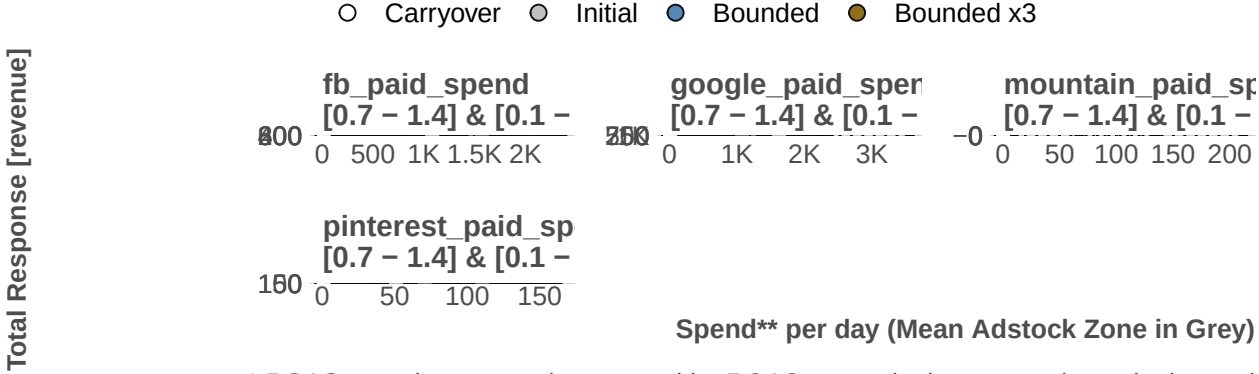
Total Budget Optimization Result



Budget Allocation per Channel*



Simulated Response Curve for Selected Allocation Period



* ROAS = total response / raw spend | mROAS = marginal response / marginal spend
* When reallocating budget, mROAS converges across media within respective bounds
** Dotted lines show budget optimization lower−upper ranges per media