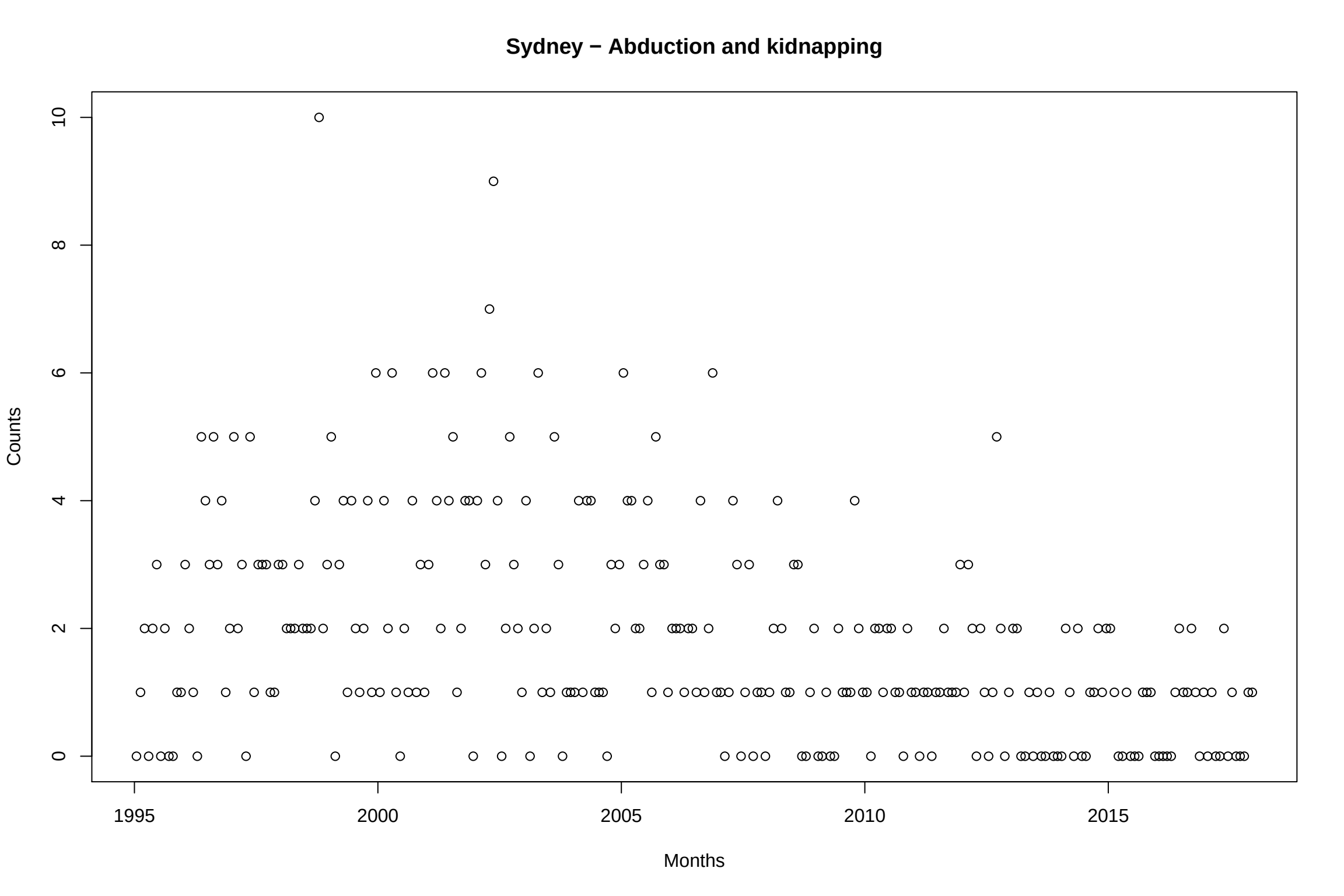
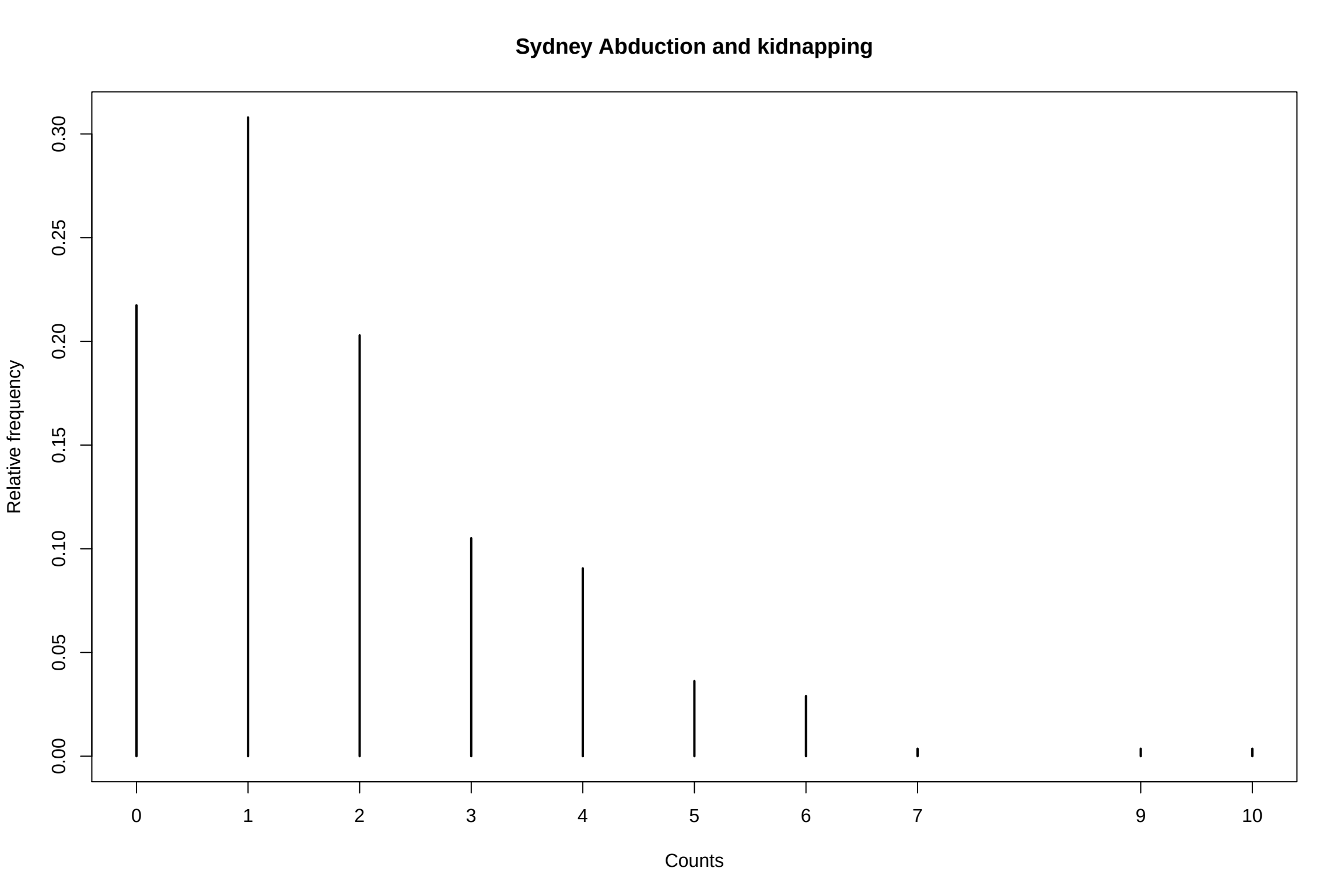
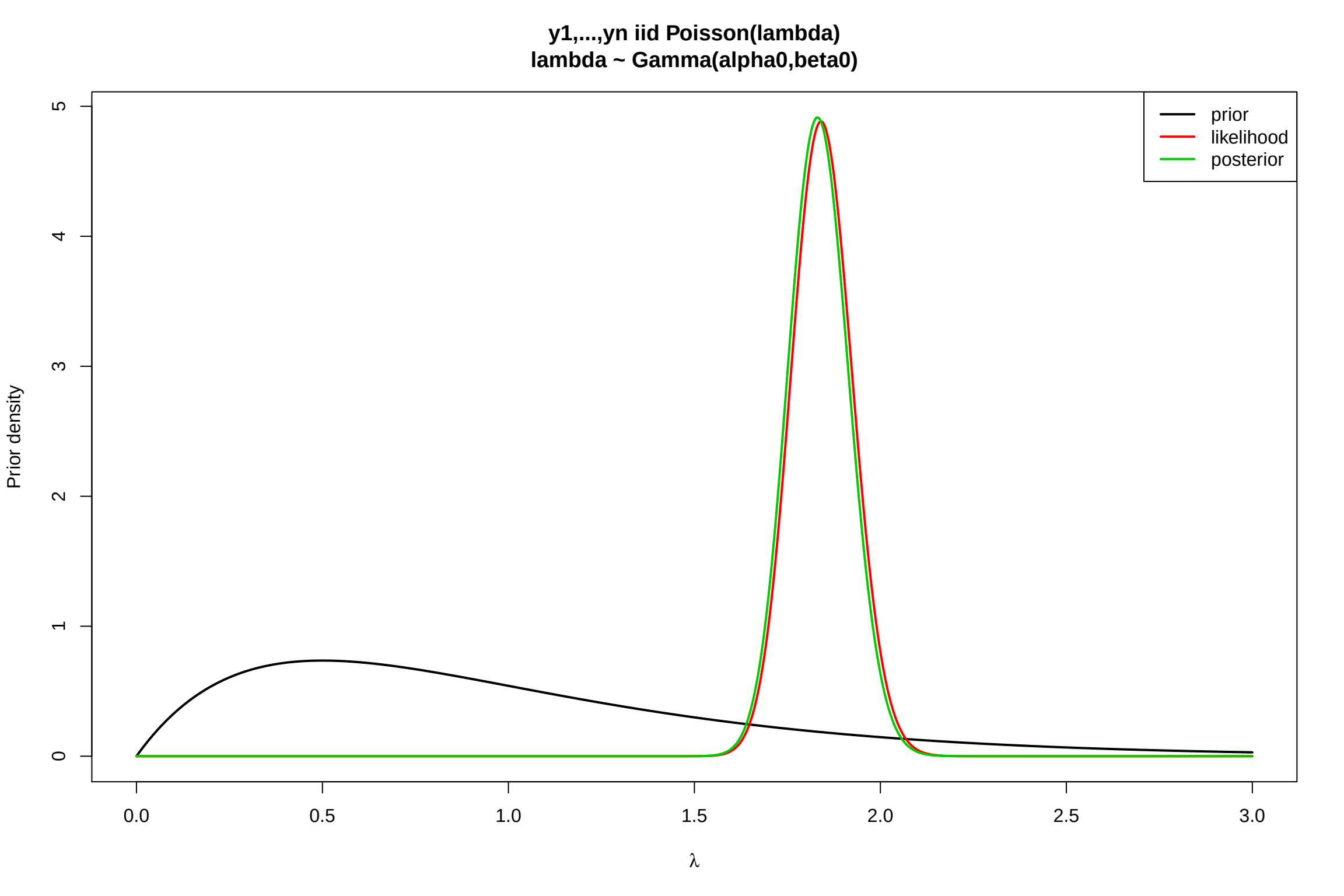
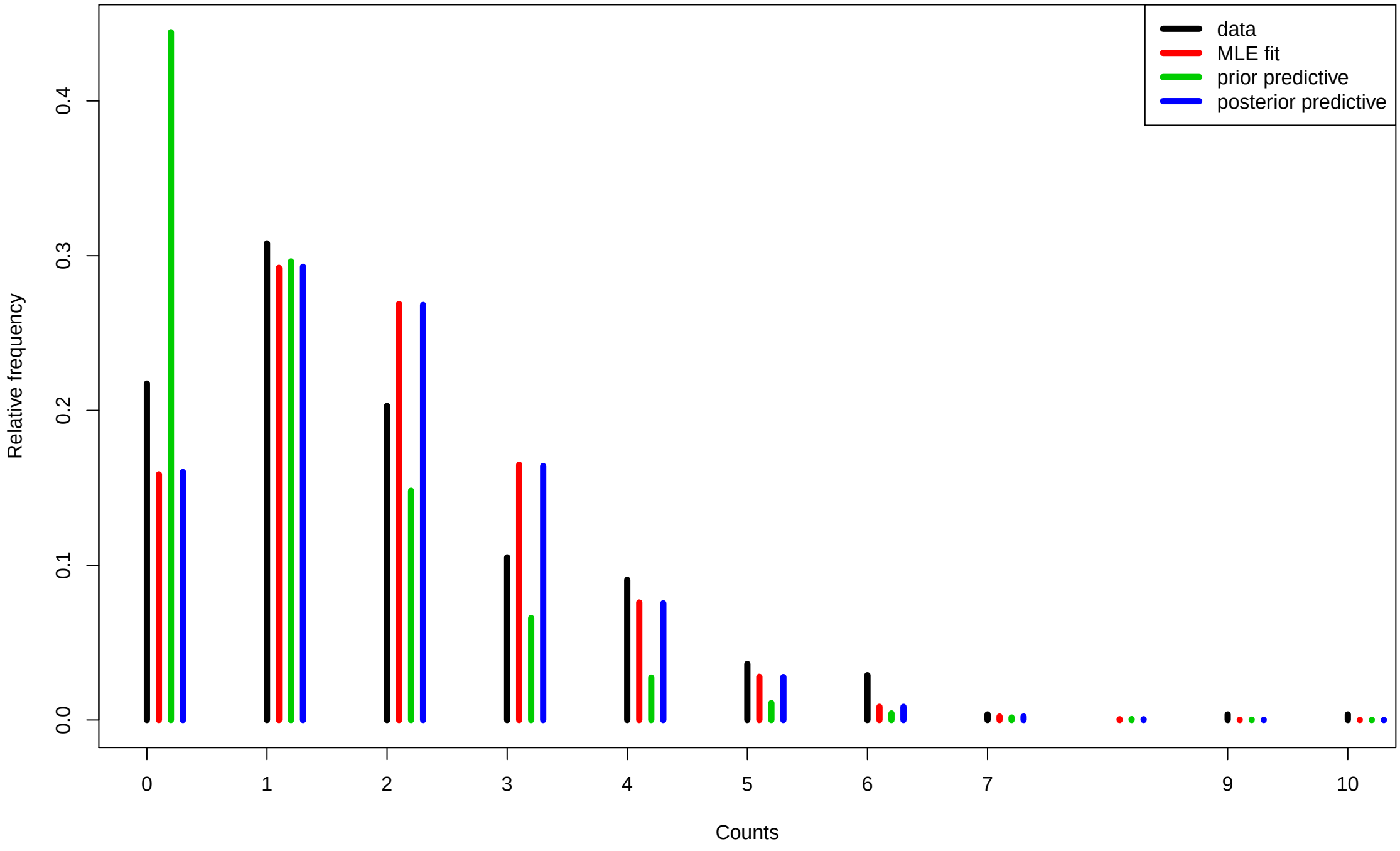
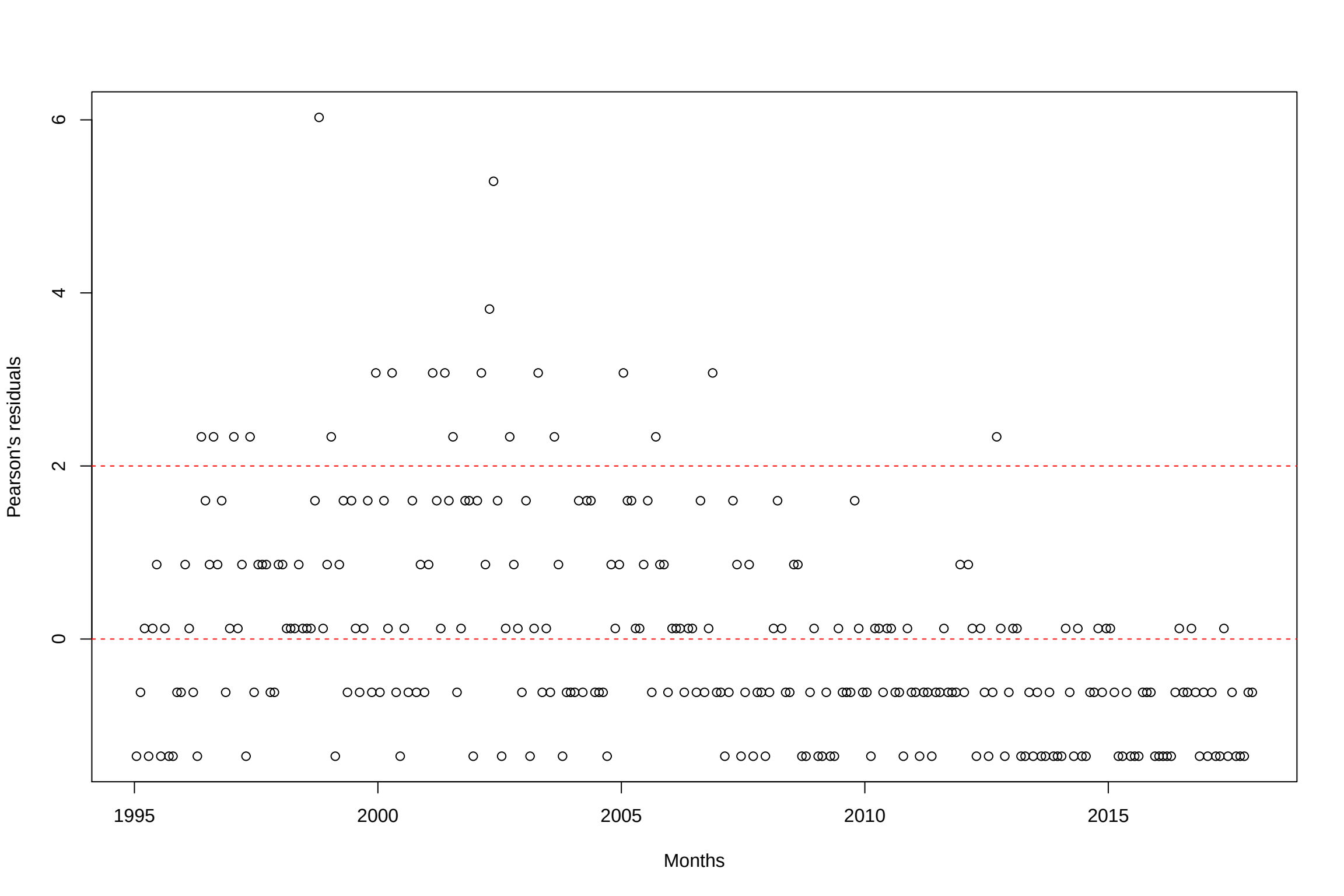
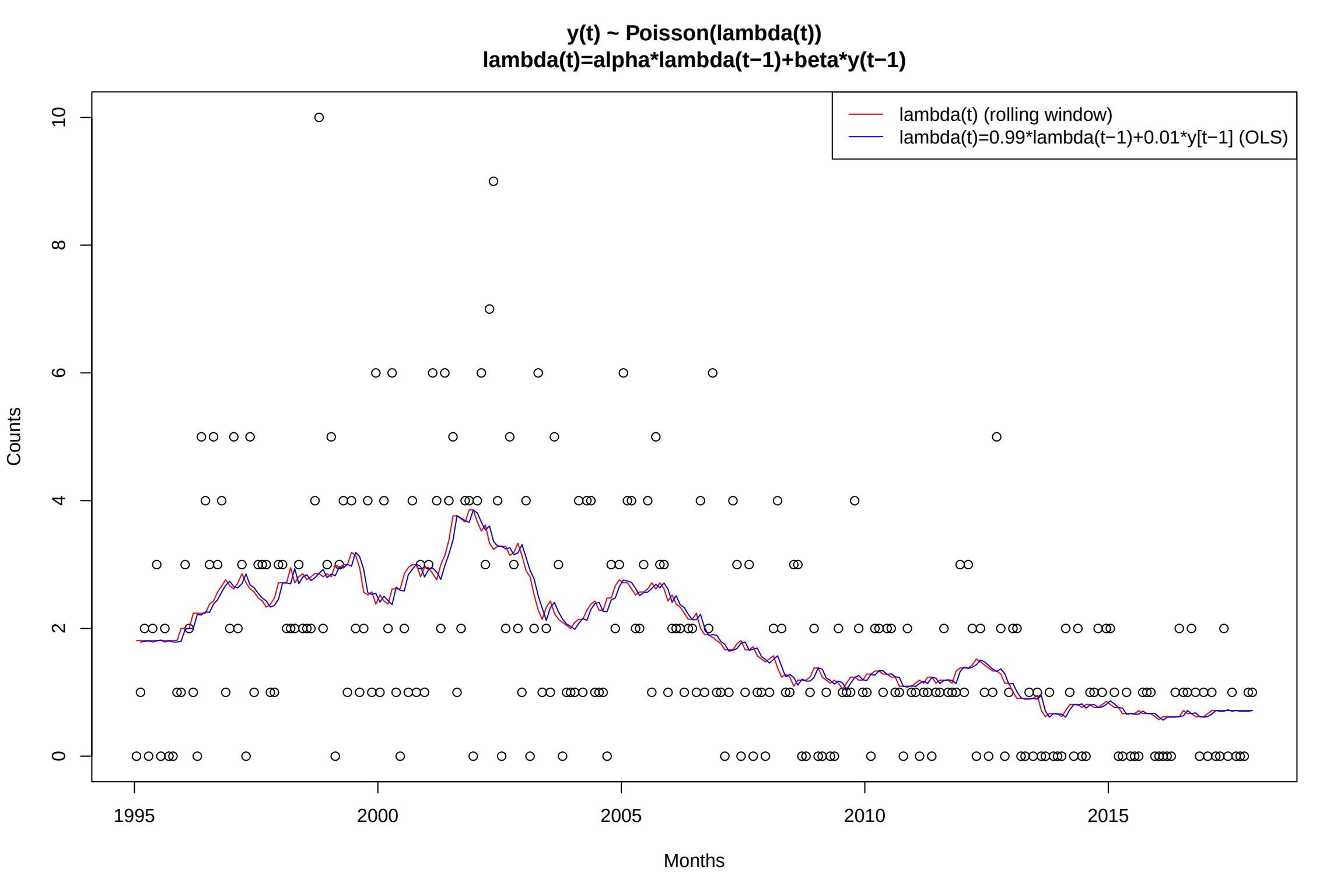

Sydney − Abduction and kidnapping
Counts
0
2
4
6
8
10
1995
2000
2005
2010
2015
Months

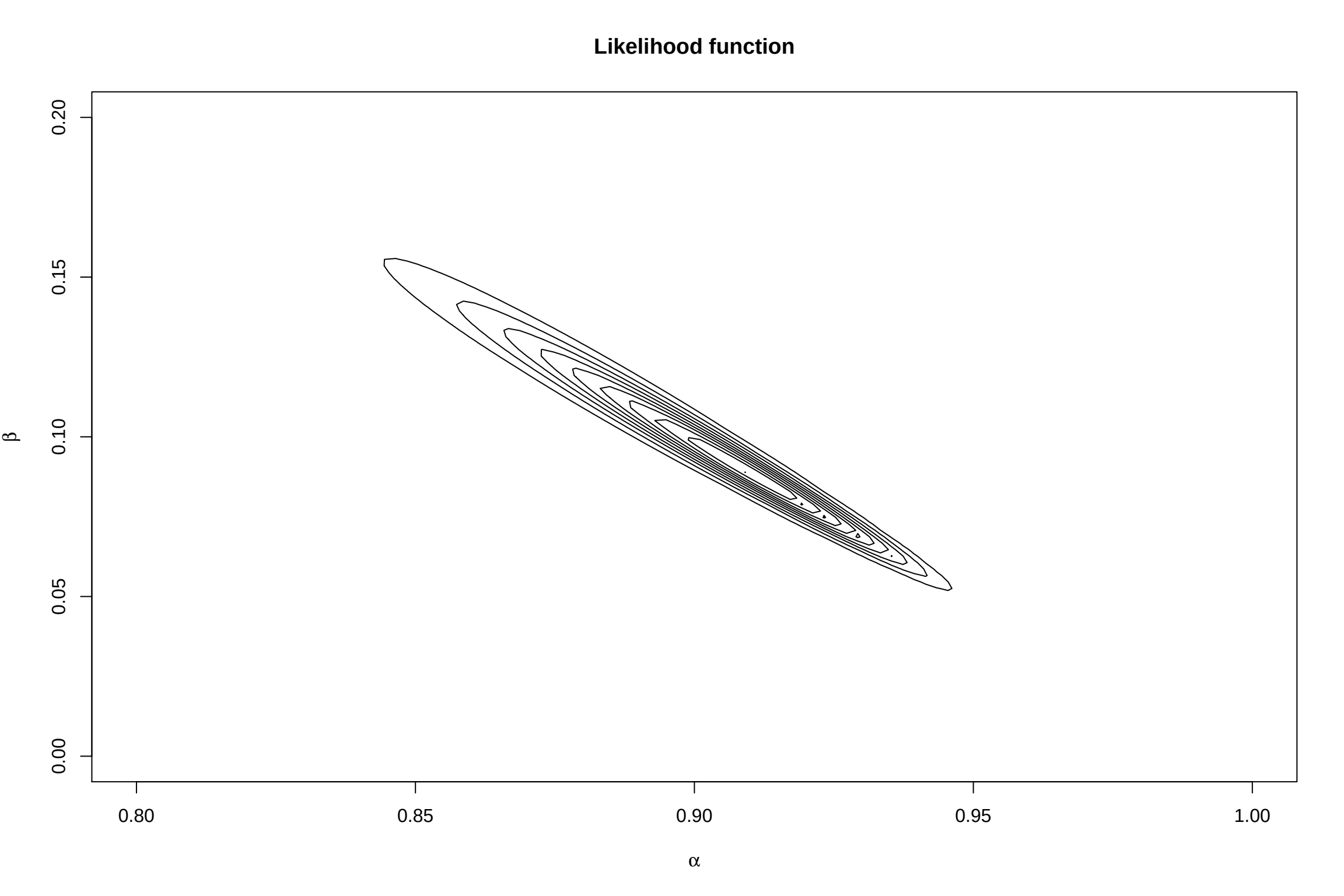

Sydney Abduction and kidnapping
Relative frequency
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0
1
2
3
4
5
6
7
9
10
Counts

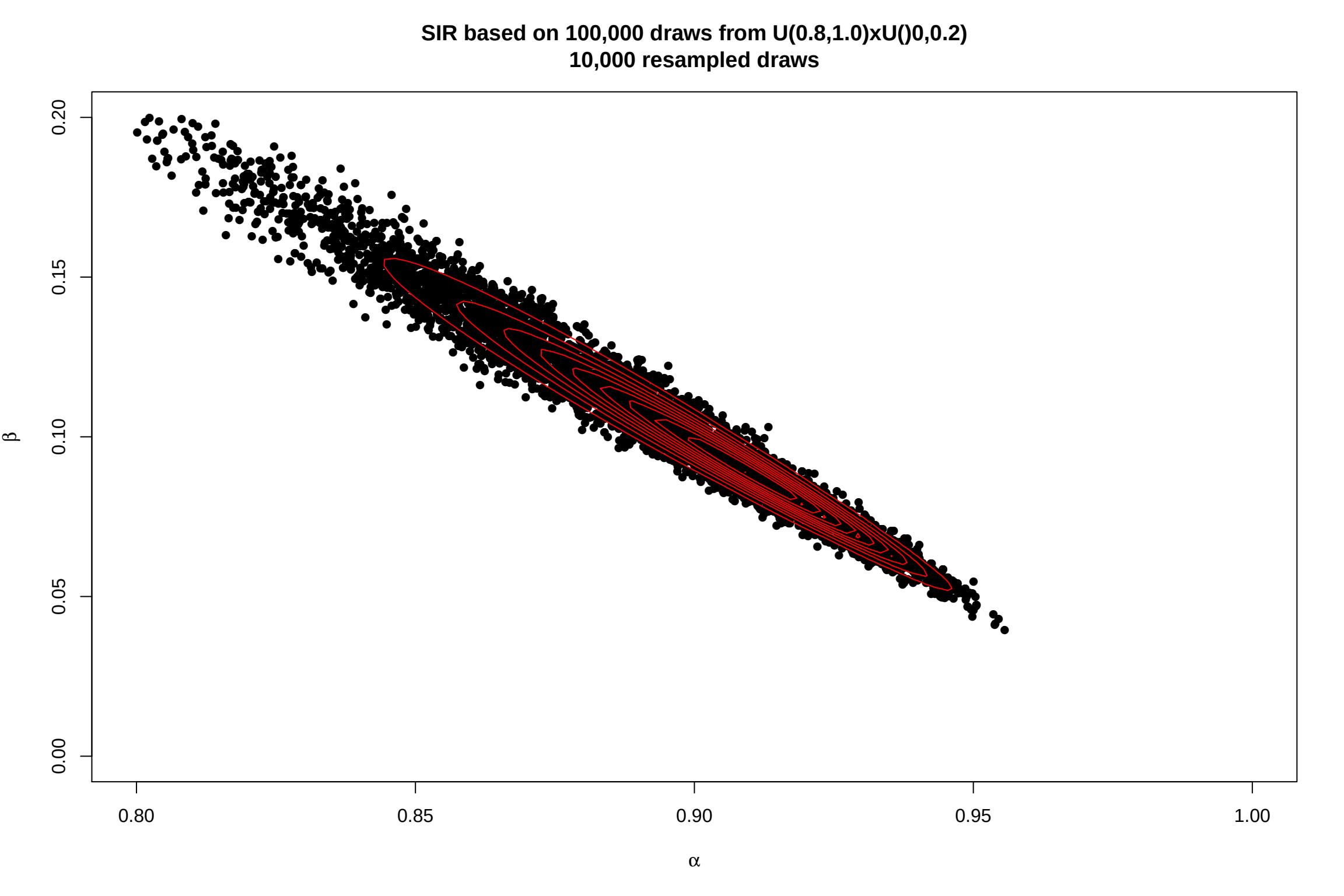

y1,...,yn iid Poisson(lambda)
lambda ~ Gamma(alpha0,beta0)
prior
likelihood
posterior
Prior density
0
1
2
3
4
5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
λ

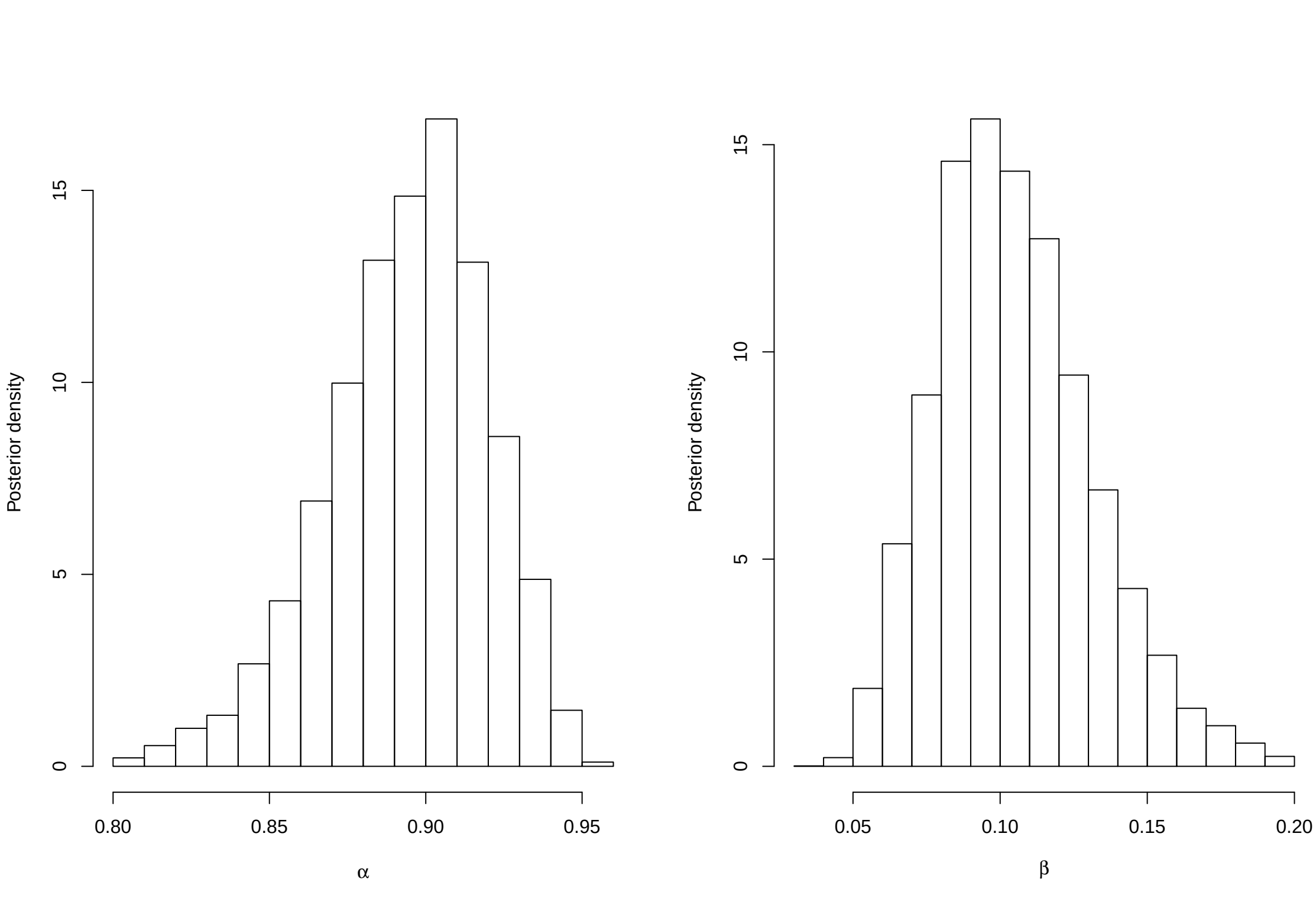

data
MLE fit
prior predictive
posterior predictive
Relative frequency
0.0
0.1
0.2
0.3
0.4
0
1
2
3
4
5
6
7
9
10
Counts

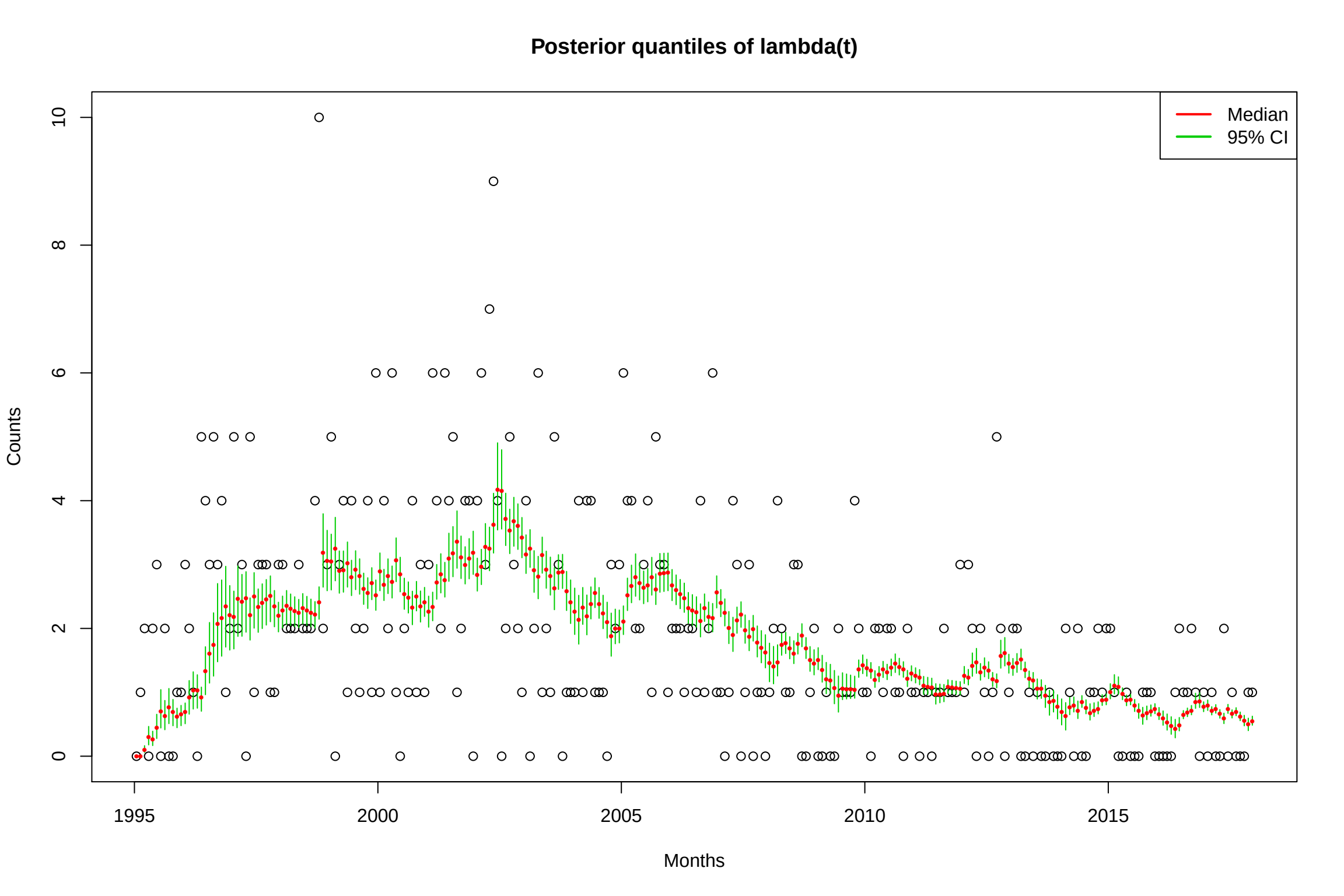

Pearson's residuals
6
4
2
0
1995
2000
2005
2010
2015
Months

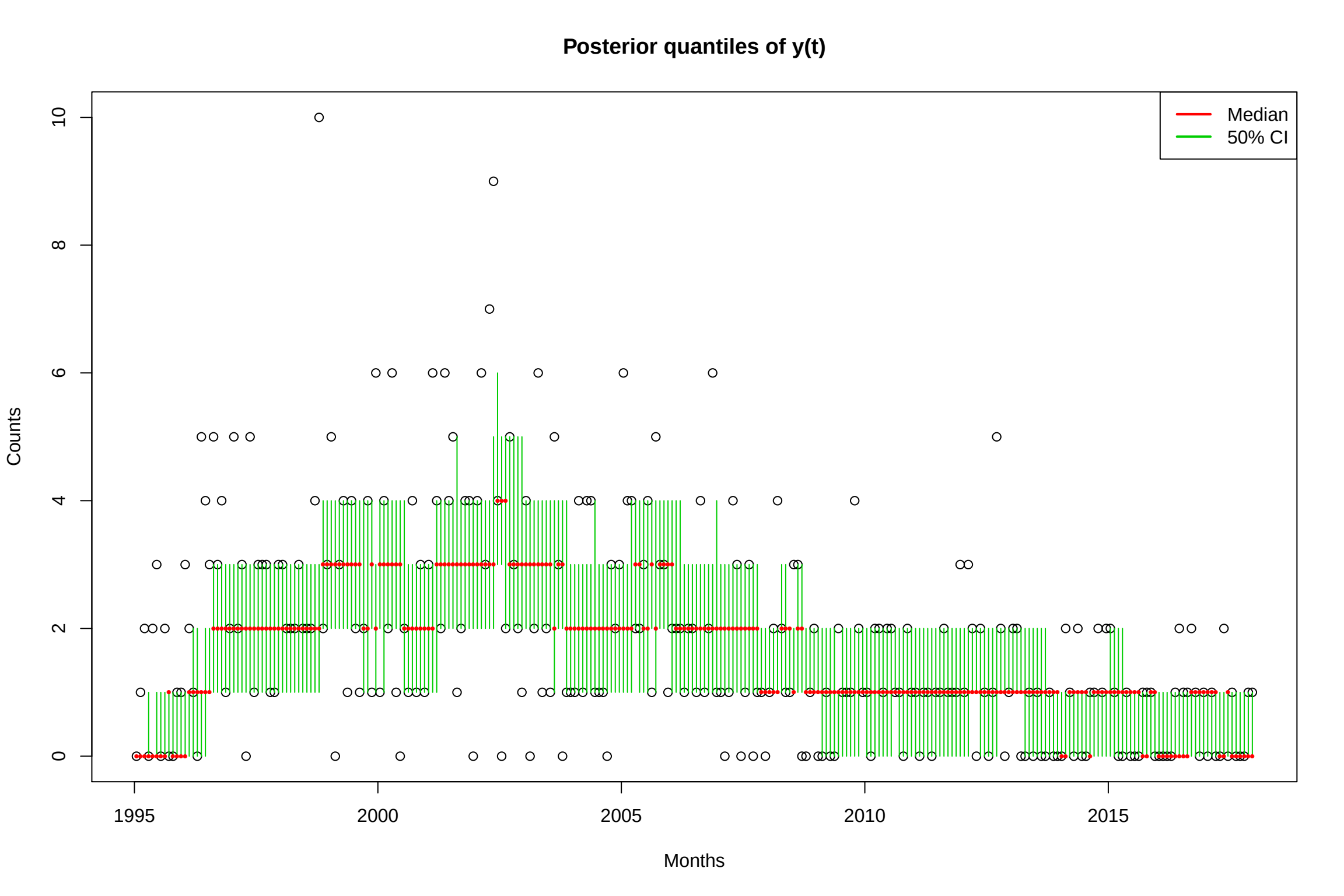

y(t) ~ Poisson(lambda(t))
lambda(t)=alpha*lambda(t−1)+beta*y(t−1)
lambda(t) (rolling window)
lambda(t)=0.99*lambda(t−1)+0.01*y[t−1] (OLS)
Counts
0
2
4
6
8
10
1995
2000
2005
2010
2015
Months

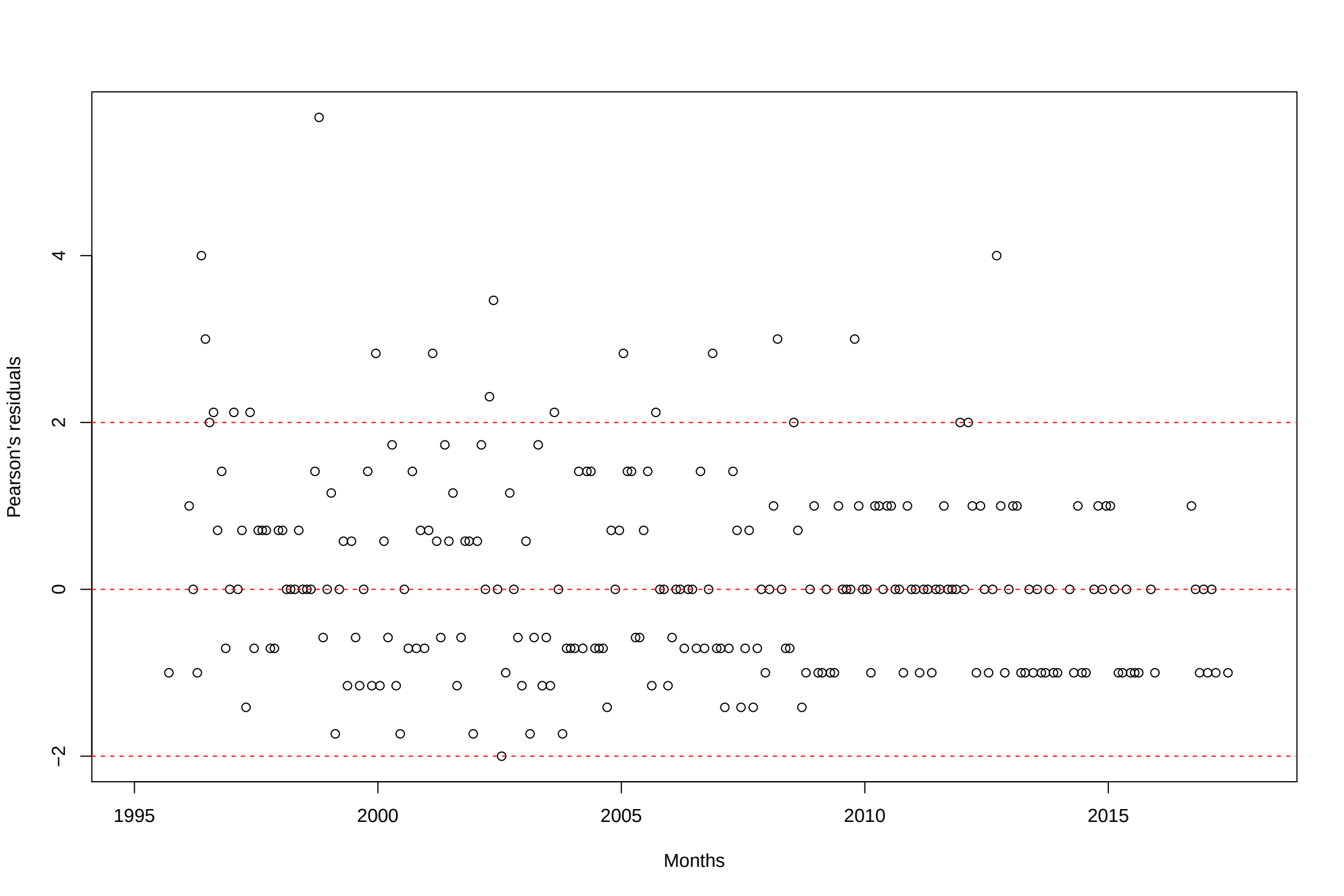

Likelihood function
0.20
0.15
0.10
0.05
0.00
β
0.80
0.85
0.90
0.95
1.00
α


SIR based on 100,000 draws from U(0.8,1.0)xU()0,0.2)
10,000 resampled draws
0.20
0.15
0.10
0.05
0.00
β
0.80
0.85
0.90
0.95
1.00
α


Posterior density
0
5
10
15
0.80
0.85
0.90
0.95
α
Posterior density
0
5
10
15
0.05
0.10
0.15
0.20
β


Posterior quantiles of lambda(t)
Median
95% CI
Counts
0
2
4
6
8
10
1995
2000
2005
2010
2015
Months


Posterior quantiles of y(t)
Median
50% CI
Counts
0
2
4
6
8
10
1995
2000
2005
2010
2015
Months


Pearson's residuals
4
2
0
−2
1995
2000
2005
2010
2015
Months