

R demo: crime and punishment

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crime and punishment

- ▶ response y : # of reported crimes per 100,000
- ▶ 15 predictors:

M	So	Ed	Po1	Po2
LF	M.F	Pop	NW	UI
U2	GDP	Ineq	Prob	Time

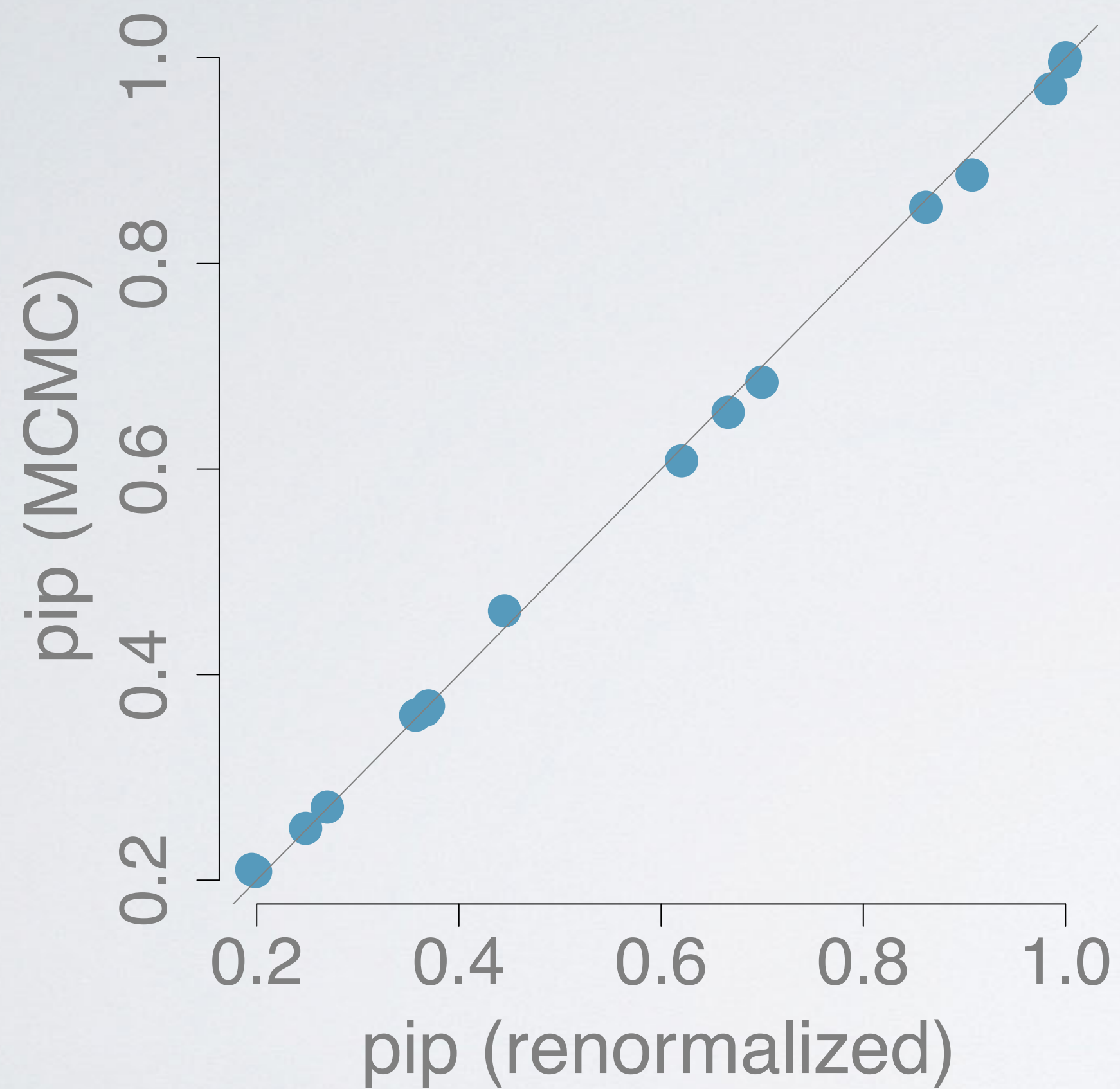
- ▶ take log transformations of all variables except for So (indicator of the state being in the southern United States)

R

```
> library(MASS)
> data(UScrime)
> UScrime[, -2] = log(UScrime[, -2])
> library(BAS)
> crime.ZS = bas.lm(y ~ .,
+                   data = UScrime,
+                   prior = "ZS-null",
+                   modelprior = uniform(),
+                   method = "MCMC")
```

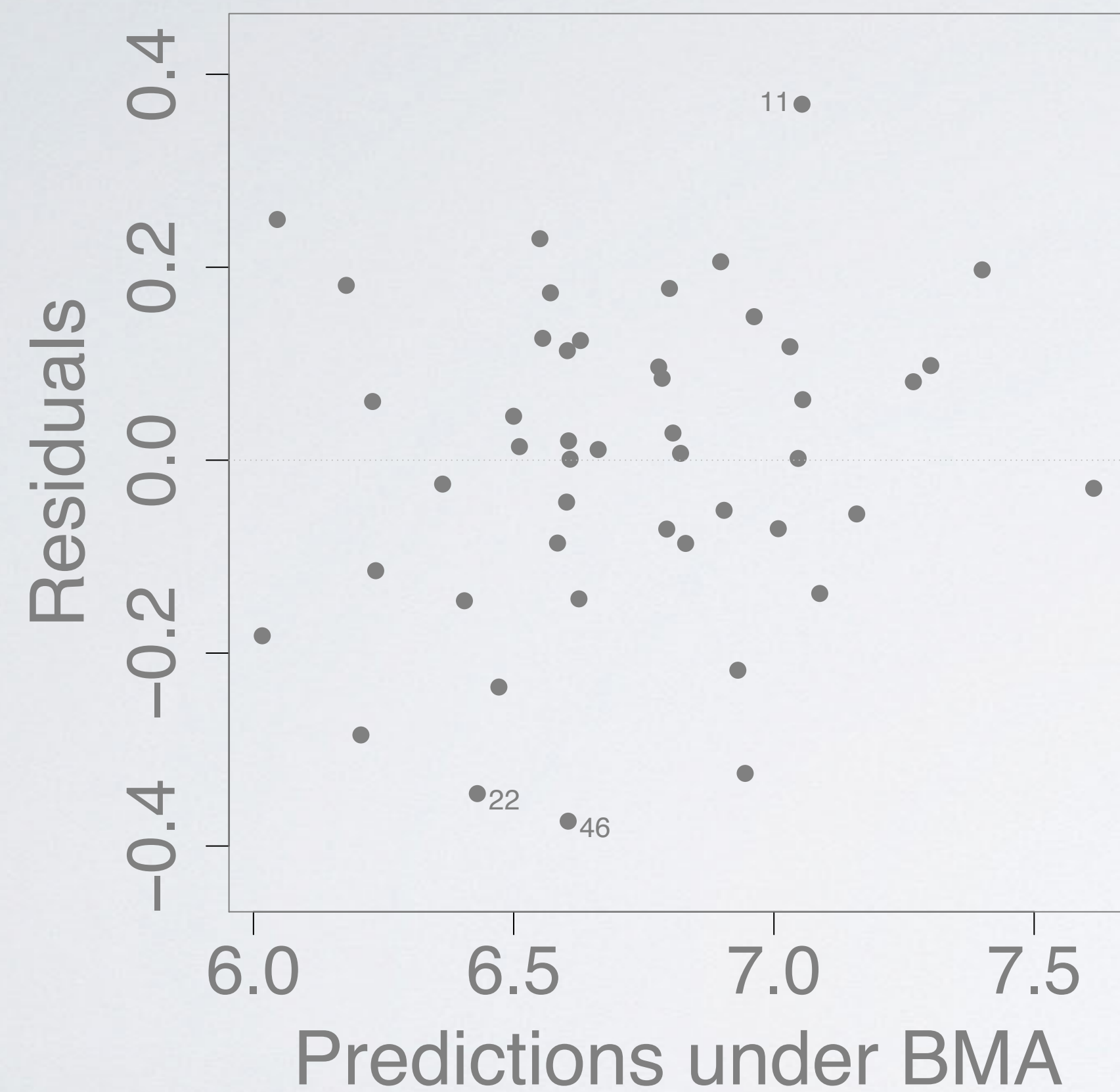
$$p_R((\beta_j \neq 0 \mid \text{data})) = \frac{1}{I} \sum_{i=1}^I \sum_{m \in S} I[X_j \in \mathcal{M}_m^{(i)}] \frac{BF[\mathcal{M}_m : \mathcal{M}_0] O[\mathcal{M}_m : \mathcal{M}_0]}{\sum_{m \in S} BF[\mathcal{M}_m : \mathcal{M}_0] O[\mathcal{M}_m : \mathcal{M}_0]}$$

```
> diagnostics(crime.zs)
```



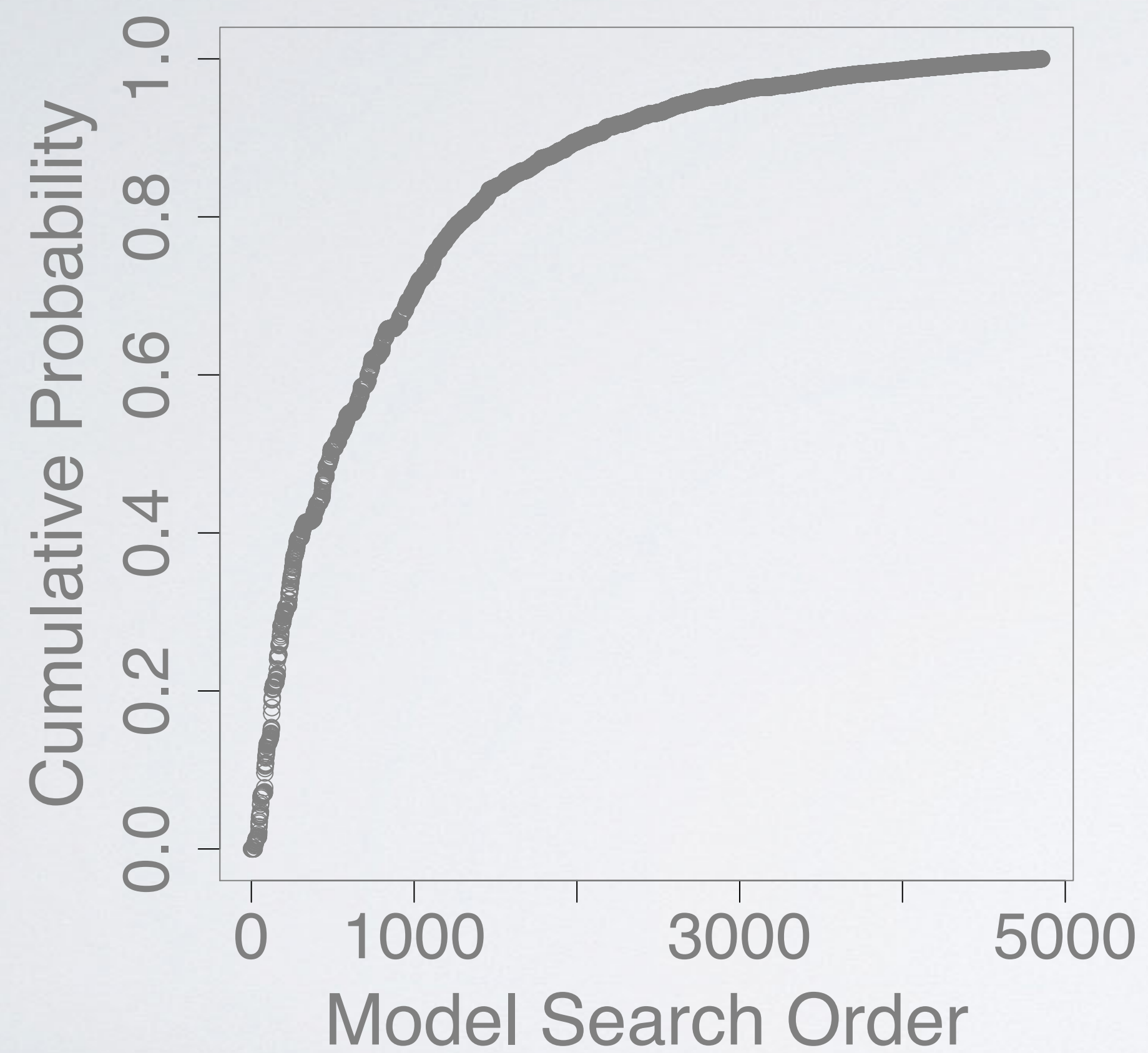
R

```
> plot(crime.zs) which = 1)
```



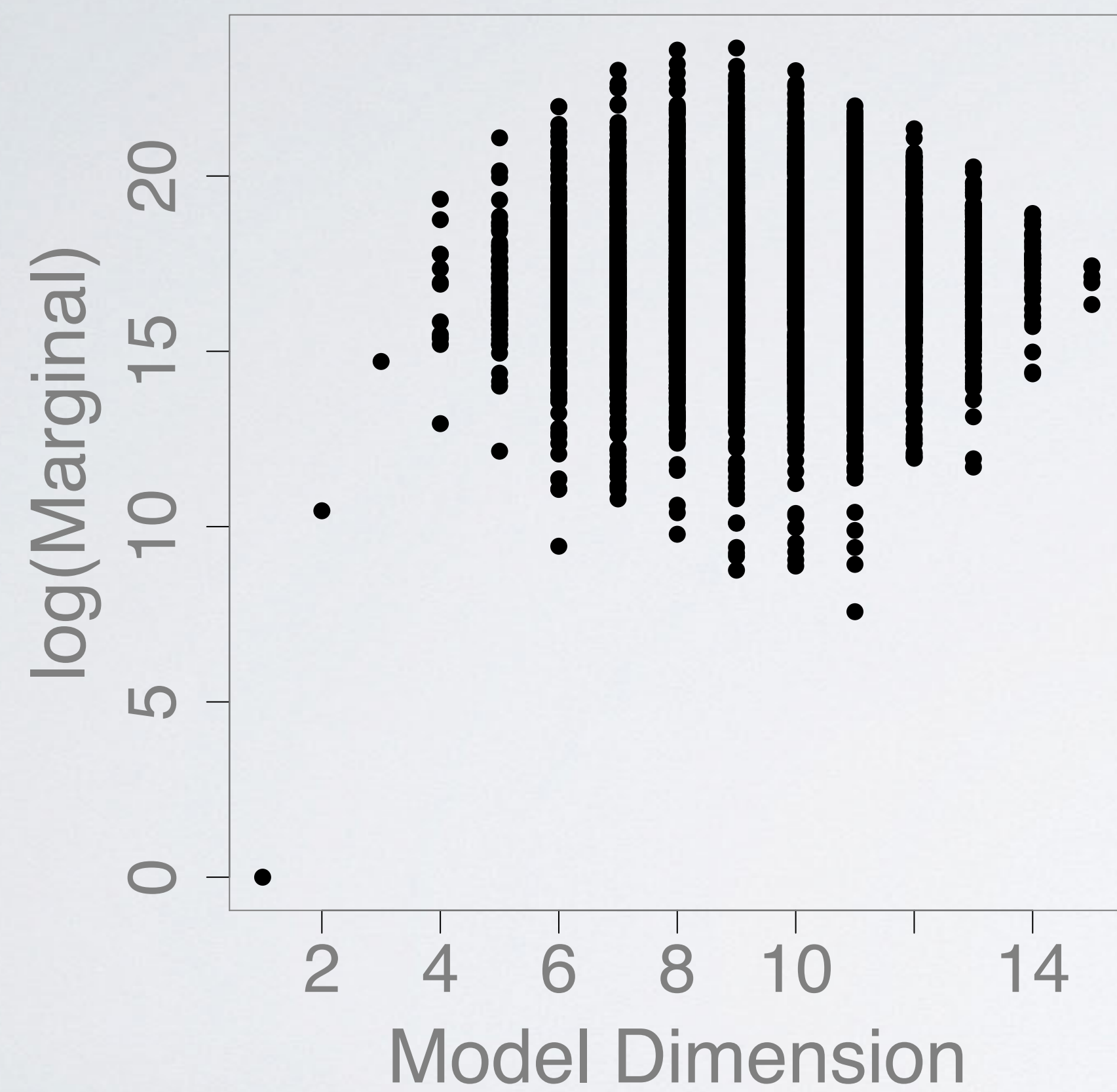
R

```
> plot(crime.zs, which = 2)
```



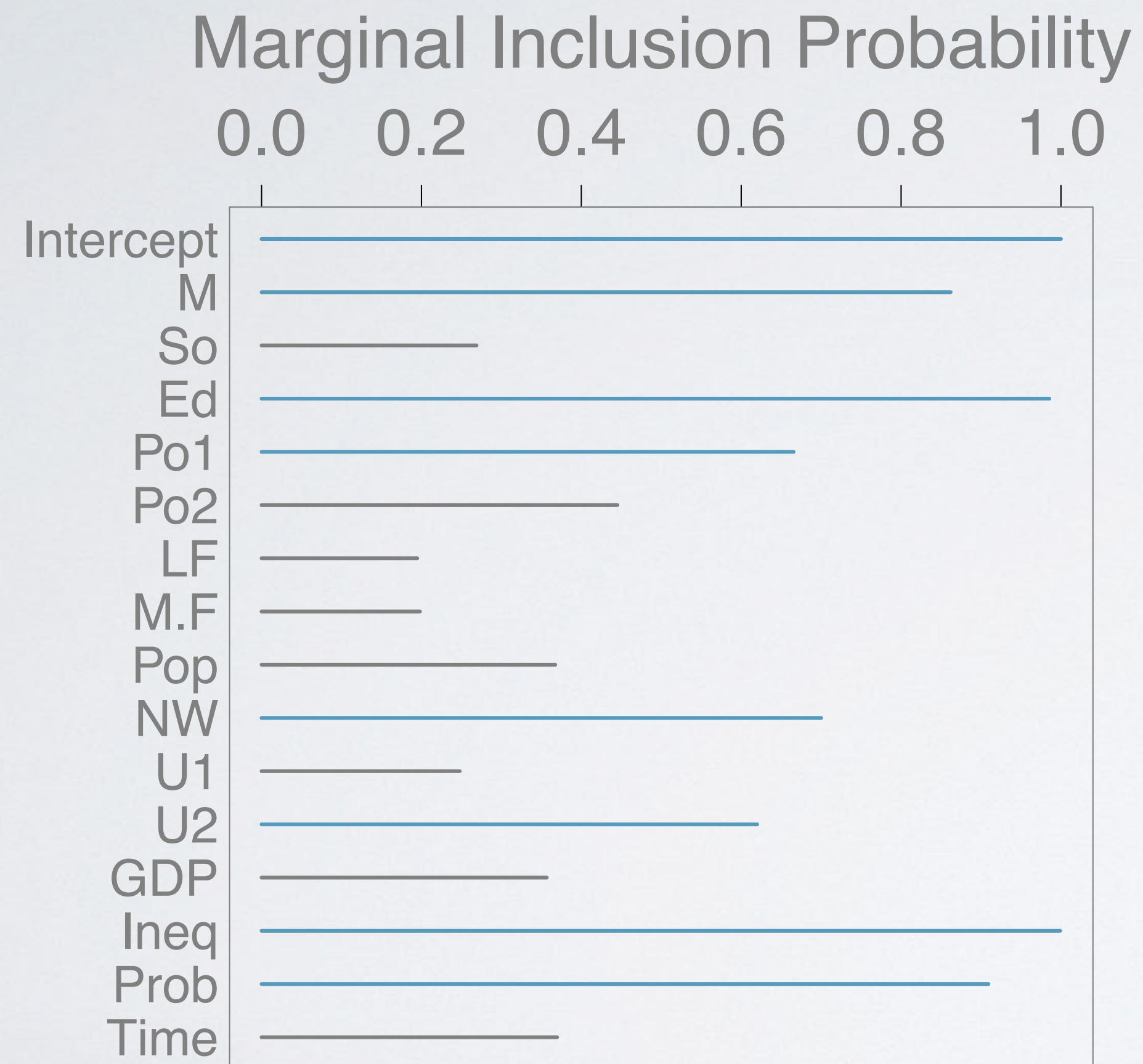
R

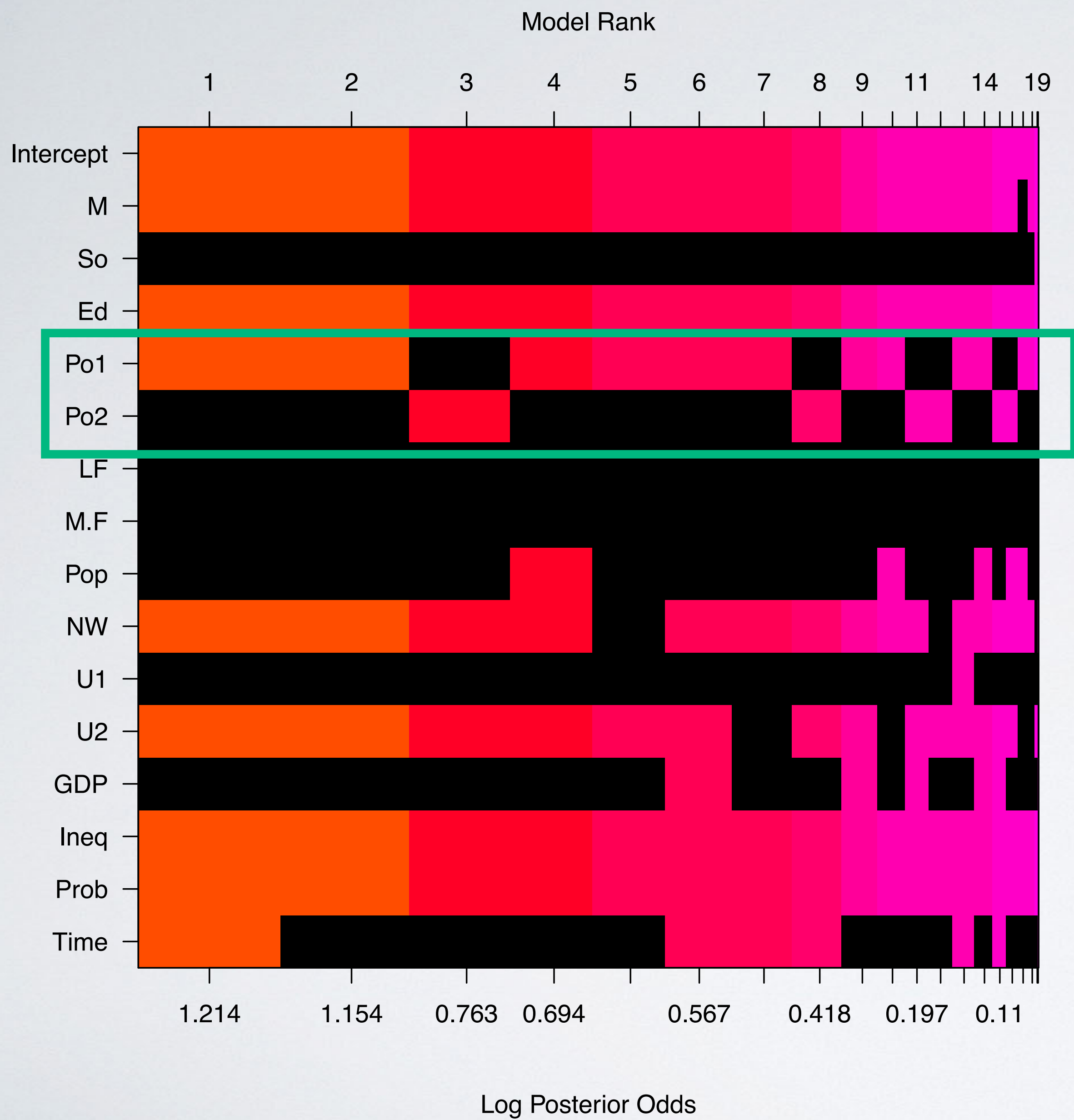
```
> plot(crime.ZS, which = 3)
```



R

```
> plot(crime.zs, which = 4)
```





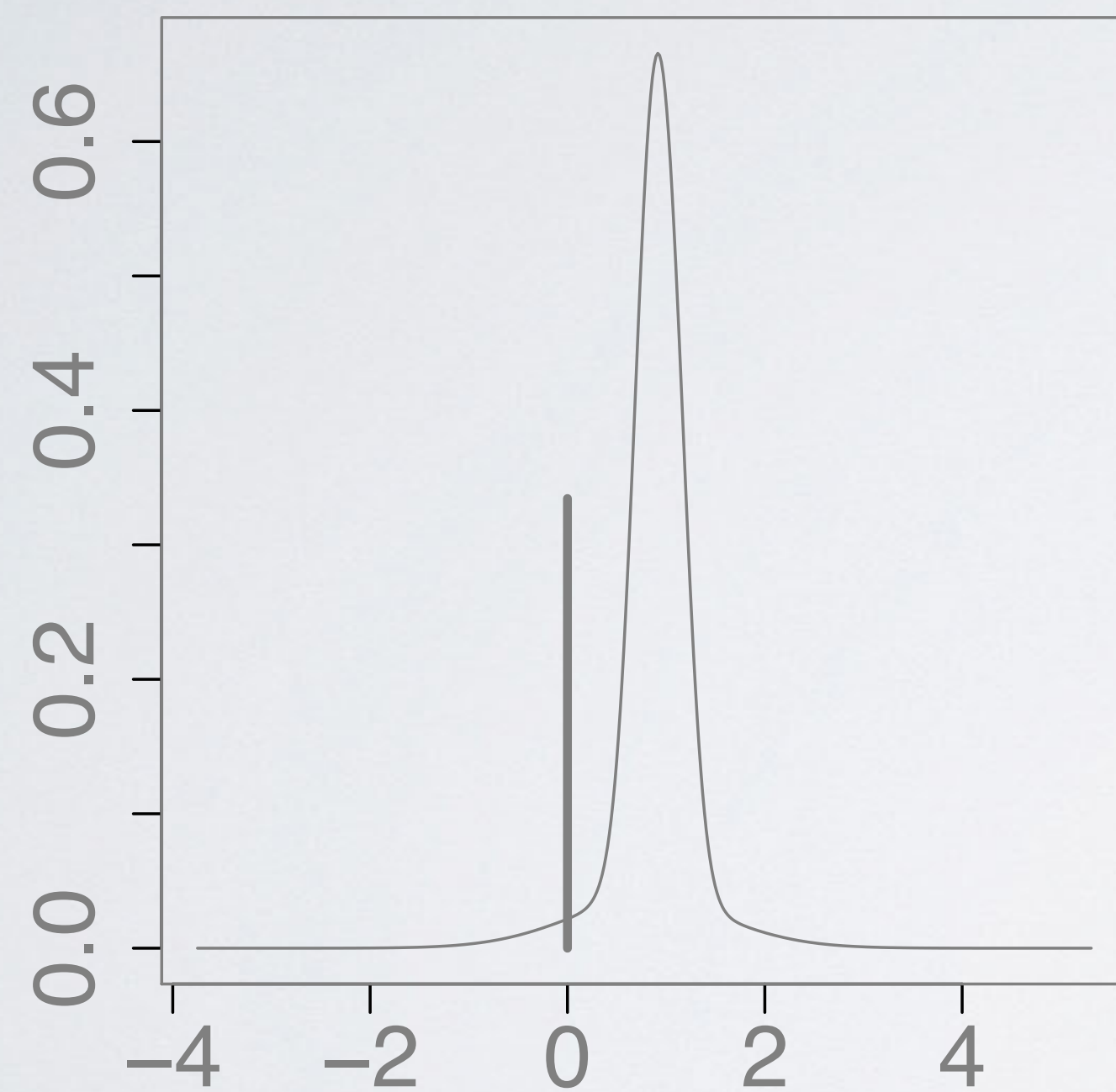
R

```
> image(crime.ZS, rotate=F)
```

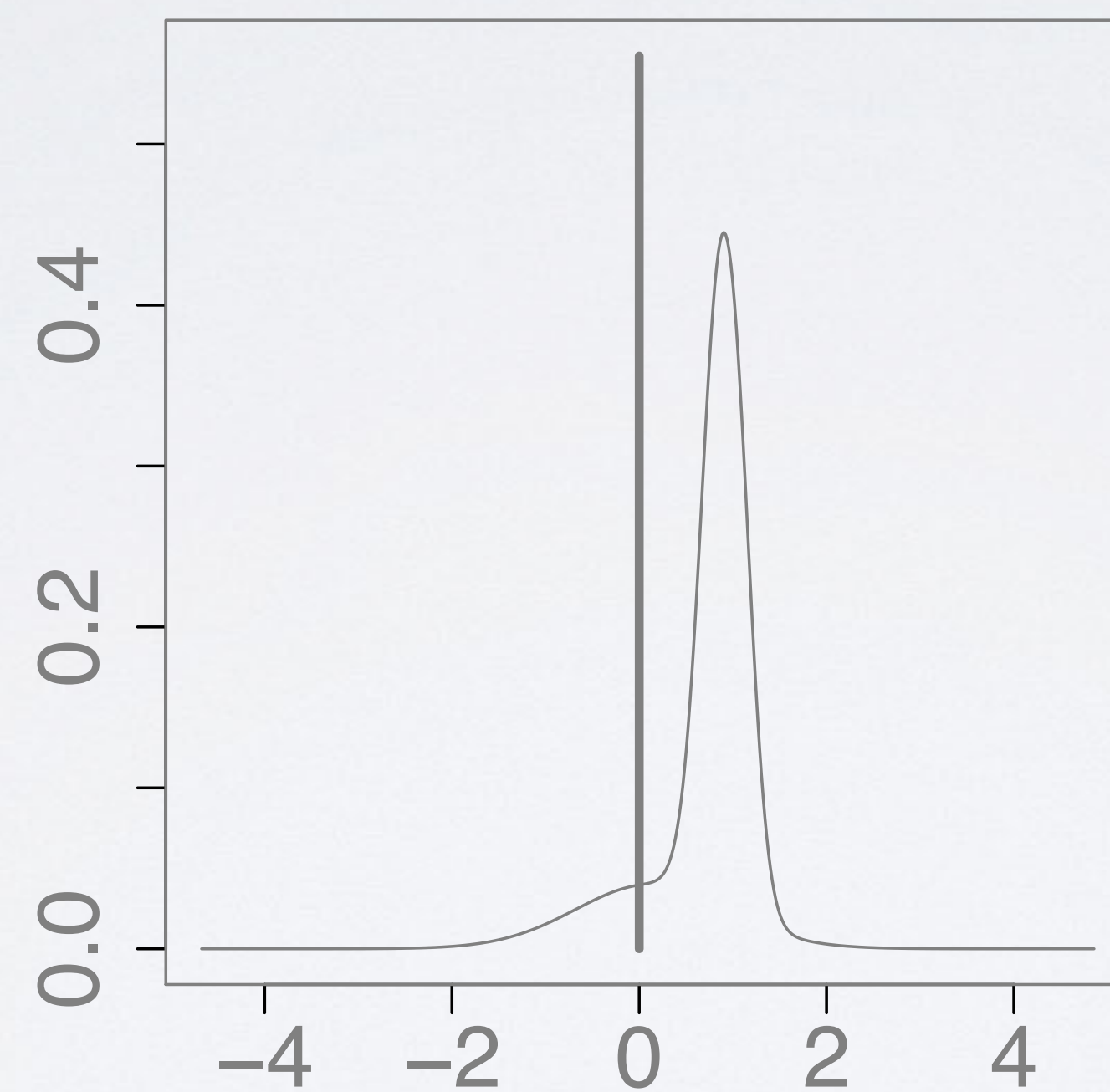

R

```
> coef.ZS=coef(crime.ZS)  
> plot(coef.ZS)
```

Po1



Po2



summary

- ▶ demo of BAS
- ▶ use of MCMC
- ▶ diagnostics
- ▶ effect of correlation

next:

- ▶ decision making and prediction