setwd("C:/R files BHMRA")

attach("DS\_9\_7.Rdata")

require(jagsUI)

library(loo)

**cat("**model { for (i in 1:n) {W[i] ~ dcat(pi[1:K])

for (j in 1:P) {y[i,j] ~ dpois(mu[i,j])

ynew[i,j] ~ dpois(mu[i,j])

LL[i,j] <- y[i,j]\*log(mu[i,j])-mu[i,j]-logfact(y[i,j])

y0[i,j] <- equals(y[i,j],0)

dv[i,j] <- y[i,j]\*log((y[i,j]+y0[i,j])/(mu[i,j]+y0[i,j]))-(y[i,j]-mu[i,j])

log(mu[i,j]) <- log(pop[i])+beta[j,1]+beta[j,2]\*unem[i]

+beta[j,3]\*border[i]+beta[j,4]\*gdp[i]+beta[j,5]\*urb[i]+u[i,j]

u[i,j] <- ustar[W[i],j]}

for (k in 1:K) {d[i,k] <- equals(W[i],k)}}

# Priors

for (j in 1:P) { for (k in 1:R) {beta[j,k] ~ dnorm(0,0.01)}}

inv.D[1:P,1:P] ~ dwish(Scale[,],P)

# truncated Dirichlet process

kappa ~ dgamma(2,4) T(0.1,)

V[K] <- 1; pi[1] <- V[1]

for (k in 1:KM){ V[k] ~ dbeta(1,kappa)}

for (j in 2:K) { pi[j] <- V[j]\*(1-V[j-1])\*pi[j-1]/V[j-1]}

for (j in 1:K) {ustar[j,1:P] ~ dmnorm(nought[],inv.D[,])}

# Scaled deviance

Dev <- 2\*sum(dv[,])

# total non-empty clusters

Kstar <- sum(C[])

for (j in 1:K) {C[j] <- step(sum(d[,j])-1)}}

**", file="model1.jag")**

**# initial values and estimation**

inits1 <- list(beta = structure(.Data = c(2.7,0.06,-0.1,0.1,-0.3,

1.3,-0.04,0.8,0.07,-0.5,

3.3,0.01,-0.8,0.2,0.3,

0.9,-0.1,0.6,0.3,0.2),.Dim = c(4,5)),inv.D=diag(0.1,4))

inits2 <- list(beta = structure(.Data = c(2.7,0.06,-0.1,0.1,-0.3,

1.3,-0.04,0.8,0.07,-0.5,

3.3,0.01,-0.8,0.2,0.3,

0.9,-0.1,0.6,0.3,0.2),.Dim = c(4,5)),inv.D=diag(1,4))

inits=list(inits1,inits2)

pars = c("beta","Kstar","kappa","Dev","mu","LL","u")

R = autojags(DS\_9\_7, inits, pars,model.file="model1.jag",2,iter.increment=5000, n.burnin=500,Rhat.limit=1.1, max.iter=50000, seed=1234, codaOnly= c('u'))

R$summary

**# Pointwise LOO-IC by Variable**

LLsamps=R$sims.list$LL

LOO1=loo(LLsamps[,,1])

LOO2=loo(LLsamps[,,2])

LOO3=loo(LLsamps[,,3])

LOO4=loo(LLsamps[,,4])

loo.pw=matrix(,49,4)

loo.pw[,1]=LOO1$pointwise[,3]

loo.pw[,2]=LOO2$pointwise[,3]

loo.pw[,3]=LOO3$pointwise[,3]

loo.pw[,4]=LOO4$pointwise[,3]

loo.pw

**# Mean residuals**

u.samps=R$sims.list$u

u.means=apply(u.samps[1:10000,,],c(2,3),mean)

hist(u.means[,3],main="Figure 9.3 Histogram of Residuals, Manslaughter",col="gray",xlab="Posterior Means",breaks=10)