model{

for(i in 1:n){

for(t in 1:T){

O1[i,t] ~ dpois(mu1[i,t])

log(mu1[i,t]) <- log(E1[i,t]) + alpha1 + beta1[1]\*X1[i,t] + beta1[2]\*X2[i,t] + beta1[3]\*X3[i,t] + beta1[4]\*X4[i,t] + beta1[5]\*X5[i,t] + beta1[6]\*X6[i,t] + S1[i] + U1[i] + b1\*trend[t] + delta1[i]\*trend[t]

R1[i,t] <- exp(alpha1 + beta1[1]\*X1[i,t] + beta1[2]\*X2[i,t] + beta1[3]\*X3[i,t] + beta1[4]\*X4[i,t] + beta1[5]\*X5[i,t] + beta1[6]\*X6[i,t] + S1[i] + U1[i] + b1\*trend[t] + delta1[i]\*trend[t])

O2[i,t] ~ dpois(mu2[i,t])

log(mu2[i,t]) <- log(E2[i,t]) + alpha2 + beta2[1]\*X1[i,t] + beta2[2]\*X2[i,t] + beta2[3]\*X3[i,t] + beta2[4]\*X4[i,t] + beta2[5]\*X5[i,t] + beta2[6]\*X6[i,t] + S2[i] + U2[i] + b2\*trend[t] + delta2[i]\*trend[t]

R2[i,t] <- exp(alpha2 + beta2[1]\*X1[i,t] + beta2[2]\*X2[i,t] + beta2[3]\*X3[i,t] + beta2[4]\*X4[i,t] + beta2[5]\*X5[i,t] + beta2[6]\*X6[i,t] + S2[i] + U2[i] + b2\*trend[t] + delta2[i]\*trend[t])

O3[i,t] ~ dpois(mu3[i,t])

log(mu3[i,t]) <- log(E3[i,t]) + alpha3 + beta3[1]\*X1[i,t] + beta3[2]\*X2[i,t] + beta3[3]\*X3[i,t] + beta3[4]\*X4[i,t] + beta3[5]\*X5[i,t] + beta3[6]\*X6[i,t] + S3[i] + U3[i] + b3\*trend[t] + delta3[i]\*trend[t]

R3[i,t] <- exp(alpha3 + beta3[1]\*X1[i,t] + beta3[2]\*X2[i,t] + beta3[3]\*X3[i,t] + beta3[4]\*X4[i,t] + beta3[5]\*X5[i,t] + beta3[6]\*X6[i,t] + S3[i] + U3[i] + b3\*trend[t] + delta3[i]\*trend[t])

O4[i,t] ~ dpois(mu4[i,t])

log(mu4[i,t]) <- log(E4[i,t]) + alpha4 + beta4[1]\*X1[i,t] + beta4[2]\*X2[i,t] + beta4[3]\*X3[i,t] + beta4[4]\*X4[i,t] + beta4[5]\*X5[i,t] + beta4[6]\*X6[i,t] +beta4[7]\*mu1[i,t] + beta4[8]\*mu2[i,t] + beta4[9]\*mu3[i,t] + S4[i] + U4[i] + b4\*trend[t] + delta4[i]\*trend[t]

R4[i,t] <- exp(alpha4 + beta4[1]\*X1[i,t] + beta4[2]\*X2[i,t] + beta4[3]\*X3[i,t] + beta4[4]\*X4[i,t] + beta4[5]\*X5[i,t] + beta4[6]\*X6[i,t] +beta4[7]\*mu1[i,t] + beta4[8]\*mu2[i,t] + beta4[9]\*mu3[i,t] + S4[i] + U4[i] + b4\*trend[t] + delta4[i]\*trend[t])

}

U1[i] ~ dnorm(0,prec.u1)

U2[i] ~ dnorm(0,prec.u2)

U3[i] ~ dnorm(0,prec.u3)

U4[i] ~ dnorm(0,prec.u4)

}

# Priors:

S1[1:n] ~ car.normal(adj[], weights[], num[],prec.s1)

prec.s1 <- pow(sigma.s1,-2)

sigma.s1 ~ dunif(0,3)

prec.u1 <- pow(sigma.u1,-2)

sigma.u1 ~ dunif(0,1)

b1 ~ dnorm(0,0.00001)

delta1[1:n] ~ car.normal(adj[], weights[], num[],prec.d1)

prec.d1 <- pow(sigma.d1,-2)

sigma.d1 ~ dunif(0,1)

alpha1 ~ dflat()

for(j in 1:6){

beta1[j] ~ dnorm(0, 0.00001)

}

S2[1:n] ~ car.normal(adj[], weights[], num[],prec.s2)

prec.s2 <- pow(sigma.s2,-2)

sigma.s2 ~ dunif(0,3)

prec.u2 <- pow(sigma.u2,-2)

sigma.u2 ~ dunif(0,1)

b2 ~ dnorm(0,0.00001)

delta2[1:n] ~ car.normal(adj[], weights[], num[],prec.d2)

prec.d2 <- pow(sigma.d2,-2)

sigma.d2 ~ dunif(0,1)

alpha2 ~ dflat()

for(j in 1:6){

beta2[j] ~ dnorm(0, 0.00001)

}

S3[1:n] ~ car.normal(adj[], weights[], num[],prec.s3)

prec.s3 <- pow(sigma.s3,-2)

sigma.s3 ~ dunif(0,3)

prec.u3 <- pow(sigma.u3,-2)

sigma.u3 ~ dunif(0,1)

b3 ~ dnorm(0,0.00001)

delta3[1:n] ~ car.normal(adj[], weights[], num[],prec.d3)

prec.d3 <- pow(sigma.d3,-2)

sigma.d3 ~ dunif(0,1)

alpha3 ~ dflat()

for(j in 1:6){

beta3[j] ~ dnorm(0, 0.00001)

}

S4[1:n] ~ car.normal(adj[], weights[], num[],prec.s4)

prec.s4 <- pow(sigma.s4,-2)

sigma.s4 ~ dunif(0,3)

prec.u4 <- pow(sigma.u4,-2)

sigma.u4 ~ dunif(0,1)

b4 ~ dnorm(0,0.00001)

delta4[1:n] ~ car.normal(adj[], weights[], num[],prec.d4)

prec.d4 <- pow(sigma.d4,-2)

sigma.d4 ~ dunif(0,1)

alpha4 ~ dflat()

for(j in 1:9){

beta4[j] ~ dnorm(0, 0.00001)

}

}