working paper

DB

June 17, 2016

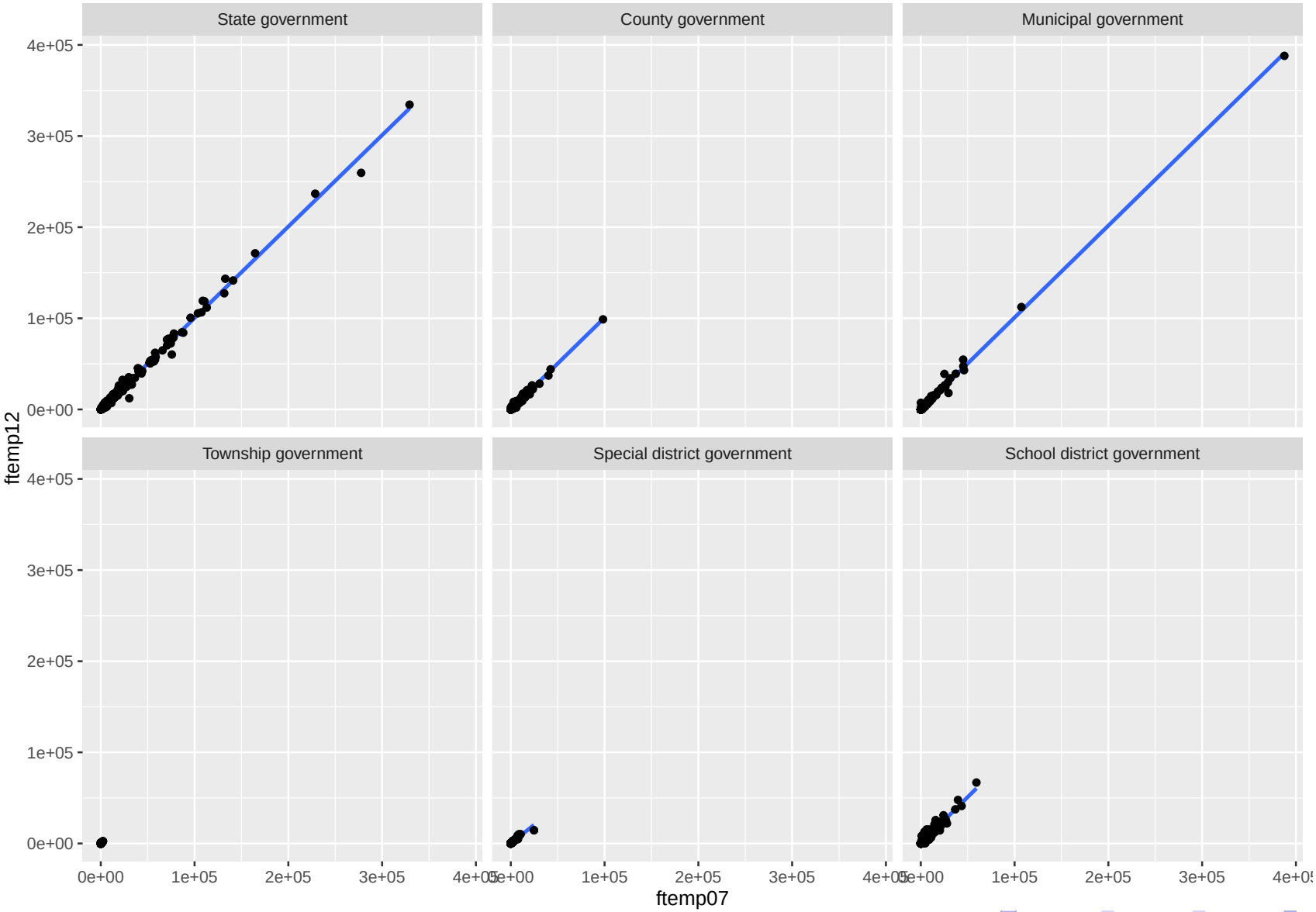
Pre-requisite

Execute :

```
devtools::install_github(
  "DanielBonnery/pubBonneryLahiriTran2016")
library(pubBonneryLahiriTran2016)
```

Descriptive statistics and graphs

```
demo(descriptive)
```



log scale:

Simple model

$$
\begin{aligned}
&\ln(\text{ftemp}_{2012,k}) \\
&\quad = \quad \beta_{0,\text{state}_k,\text{code}_k,\text{type}_k} \\
&\qquad\quad +\beta_{1,\text{state}_k,\text{code}_k,\text{type}_k} \times \ln(\text{ftemp}_{2007,k}) + \varepsilon_k
\end{aligned}
$$

with all fixed parameters, normal prior on all the β. inverse gamma prior on variance parameter.

The model used in jags is:

```
"model {
    for (i in 1:N) {
    lftemp12[i]~
      dnorm(beta0[state[i],itemcode[i],type_of_gov[i]]+
            beta1[state[i],itemcode[i],type_of_gov[i]]*
            lftemp07[i],tau)}
  for (i1 in 1:dime[1]) {
    for (i2 in 1:dime[2]) {
    for (i3 in 1:dime[3]) {
    beta0[i1,i2,i3]~ dnorm (0 ,1.0E-4);
    beta1[i1,i2,i3]~ dnorm (1 ,1.0E-4);}}}
    tau~ dgamma (1.0E-4 ,1.0E-4);
    sigma <- 1/tau
    }"
```

To execute:

```
library(pubBonneryLahiriTran2016)
demo(mcmc1)
```

Model discussed

$$\begin{aligned}
&\ln(\text{ftemp}_{2012,k}) \\
&= \beta_{0,\text{state}_k,\text{code}_k,\text{type}_k} \\
&\quad + \beta_{1,\text{state}_k,\text{code}_k,\text{type}_k} \times \ln(\text{ftemp}_{2007,k}) + \varepsilon_k
\end{aligned}$$

With β mixed effects. $\beta_{i,\text{state}_k,\text{code}_k,\text{type}_k} = \gamma_{i,\text{state}_k,\text{code}_k,\text{type}_k}$

R code