dem_regional

```r
library("ggplot2")
library("knitr")
library("MCMCpack")
library("pander")
library("MHadaptive")
library("mvtnorm")
library("coda")
library("ggmcmc")
library("dplyr")

library("microbenchmark") # test speed of various approaches
```

загружаем все, то есть обе :), цепи:

```r
ch1 <- readRDS("./estimation/pars_chain.Rds")
ch2 <- readRDS("./estimation/pars_chain2.Rds")
ch3 <- readRDS("./estimation/pars_chain3.Rds")
n_burnin <- 7500
n_sim <- nrow(ch1)
n_eff <- n_sim - n_burnin
m1 <- mcmc(tail(ch1,n_eff)) # transform to mcmc object
m2 <- mcmc(tail(ch2,n_eff)) # take last observations only
m3 <- mcmc(tail(ch3,n_eff)) # take last observations only

all_chains <- mcmc.list(m1,m2,m3)
# head(all_chains)
# summary(all_chains)
```

Собственно диагностика

```r
gelman.diag(all_chains)
```

```
## Potential scale reduction factors:
##
##              Point est. Upper C.I.
## rho                1.02       1.06
## alpha              1.00       1.00
## beta               1.00       1.00
## theta              1.00       1.00
## shurban            1.00       1.00
## density            1.00       1.00
## numchange          1.00       1.00
## inv.gdp            1.00       1.00
## raw                1.00       1.00
## manufact           1.00       1.00
## govern             1.00       1.00
## nogovern           1.00       1.00
## sharetransf        1.00       1.00
## sharehigheduc      1.00       1.01
```

```
## patents             1.00      1.00
## openexp             1.00      1.00
## openimp             1.00      1.00
## w_shurban            1.00      1.01
## w_density            1.00      1.00
## w_numchange          1.00      1.00
## w_inv.gdp            1.00      1.00
## w_raw                1.00      1.01
## w_manufact           1.00      1.01
## w_govern             1.00      1.01
## w_nogovern           1.00      1.00
## w_sharetransf        1.00      1.00
## w_sharehigheduc      1.00      1.00
## w_patents            1.00      1.00
## w_openexp            1.00      1.00
## w_openimp            1.00      1.00
## s2                   1.00      1.00
## v1                   1.04      1.04
## v2                   1.06      1.06
## v3                   1.00      1.00
## v4                   1.11      1.11
## v5                   1.08      1.08
## v6                   1.01      1.01
## v7                   1.15      1.15
## v8                   1.27      1.28
## v9                   1.08      1.08
## v10                  1.23      1.23
## v11                  1.04      1.05
## v12                  1.11      1.11
## v13                  1.12      1.13
## v14                  1.00      1.00
## v15                  1.04      1.04
## v16                  1.21      1.21
## v17                  1.00      1.00
## v18                  1.02      1.02
## v19                  1.13      1.14
## v20                  1.01      1.01
## v21                  1.11      1.11
## v22                  1.07      1.08
## v23                  1.07      1.07
## v24                  1.20      1.20
## v25                  1.01      1.01
## v26                  1.13      1.14
## v27                  1.21      1.21
## v28                  1.05      1.05
## v29                  1.05      1.06
## v30                  1.05      1.05
## v31                  1.01      1.01
## v32                  1.20      1.20
## v33                  1.03      1.03
## v34                  1.06      1.06
## v35                  1.06      1.06
## v36                  1.03      1.03
## v37                  1.06      1.06
```

```
## v38                1.29     1.30
## v39                1.27     1.27
## v40                1.02     1.02
## v41                1.00     1.00
## v42                1.14     1.14
## v43                1.12     1.12
## v44                1.02     1.02
## v45                1.00     1.00
## v46                1.01     1.01
## v47                1.09     1.09
## v48                1.00     1.00
## v49                1.00     1.01
## v50                1.09     1.09
## v51                1.04     1.04
## v52                1.03     1.03
## v53                1.04     1.04
## v54                1.22     1.22
## v55                1.10     1.10
## v56                1.13     1.13
## v57                1.02     1.02
## v58                1.11     1.11
## v59                1.03     1.03
## v60                1.14     1.14
## v61                1.00     1.01
## v62                1.09     1.09
## v63                1.00     1.00
## v64                1.12     1.12
## v65                1.04     1.04
## v66                1.01     1.01
## v67                1.18     1.19
## v68                1.00     1.00
## v69                1.01     1.01
## v70                1.01     1.01
## v71                1.04     1.04
## v72                1.00     1.00
## v73                1.07     1.07
## v74                1.17     1.17
## q             1.00     1.00
##
## Multivariate psrf
##
## 1.02
```

geweke.diag(all_chains)

```
## [[1]]
##
## Fraction in 1st window = 0.1
## Fraction in 2nd window = 0.5
##
##          rho        alpha         beta        theta
##      1.431128    -0.926820    -1.370414     0.834492
##        shurban      density    numchange      inv.gdp
```

```
##      0.890260     -0.371606      0.358837     -0.346688
##           raw       manufact        govern       nogovern
##     -0.002337     -0.014032     -1.084711     -0.474997
##    sharetransf  sharehigheduc       patents        openexp
##      0.021396      0.104670     -1.007759     -0.956800
##        openimp      w_shurban     w_density    w_numchange
##     -0.635730      1.380736     -0.723851      1.306247
##      w_inv.gdp         w_raw     w_manufact       w_govern
##     -0.491835     -0.539884     -0.748010      1.927630
##     w_nogovern  w_sharetransf w_sharehigheduc      w_patents
##     -0.680057     -1.081972     -0.860298      1.249567
##       w_openexp      w_openimp            s2             v1
##      1.593179     -1.047674     -1.980223      1.194524
##            v2            v3            v4            v5
##      0.743525      1.288055      0.423990     -0.281041
##            v6            v7            v8            v9
##      1.616355     -0.788721     -0.765958      1.188491
##           v10           v11           v12           v13
##      0.247640      2.095974     -0.212507     -0.509508
##           v14           v15           v16           v17
##      0.279285      0.292645     -0.029158      0.402689
##           v18           v19           v20           v21
##      0.441770     -0.174436     -0.106079      0.275499
##           v22           v23           v24           v25
##      0.108870      1.198482     -0.427209     -0.621725
##           v26           v27           v28           v29
##     -0.111764     -0.742673     -0.466070     -0.083718
##           v30           v31           v32           v33
##     -0.140984      1.212859      0.222790      0.975013
##           v34           v35           v36           v37
##     -0.855541      0.084294      0.793909      1.161380
##           v38           v39           v40           v41
##     -0.853870      0.608685      0.196013      0.773394
##           v42           v43           v44           v45
##      0.074978      1.347084      0.631855     -1.864372
##           v46           v47           v48           v49
##     -1.495380     -0.088760      1.413542      0.331043
##           v50           v51           v52           v53
##      0.790979     -1.958556      1.924429     -0.722390
##           v54           v55           v56           v57
##     -0.503273      0.217260     -0.897087      1.926664
##           v58           v59           v60           v61
##     -0.081761      0.882930      0.648156      1.121472
##           v62           v63           v64           v65
##      0.798279      1.038363      0.890257      1.616969
##           v66           v67           v68           v69
##      0.948310      0.881248      0.937879      1.180933
##           v70           v71           v72           v73
##      0.002894     -0.042404      0.004407      1.113025
##           v74             q
##      0.080267     -2.207537
##
##
## [[2]]
```

```
## 
## Fraction in 1st window = 0.1
## Fraction in 2nd window = 0.5
## 
##          rho          alpha           beta          theta
##       -0.94138       1.47629        0.69196       -0.01266
##        shurban        density       numchange        inv.gdp
##        0.16861       0.27779       -0.67825       -0.58431
##          raw         manufact        govern         nogovern
##        0.21760       0.15287        0.64188       -0.04179
##    sharetransf   sharehigheduc      patents        openexp
##        0.59397      -1.71699        0.46944        1.23683
##        openimp      w_shurban      w_density     w_numchange
##       -0.52589      -1.11005        1.59204       -0.19533
##      w_inv.gdp         w_raw       w_manufact       w_govern
##       -0.22112      -0.71277       -1.31433       -0.77769
##     w_nogovern   w_sharetransf  w_sharehigheduc    w_patents
##       -1.64520      -0.50050        0.94347        0.35454
##      w_openexp      w_openimp          s2             v1
##       -1.05803       1.20439        0.24359        0.50688
##          v2            v3            v4             v5
##        1.34912       0.57581        0.46505        0.78042
##          v6            v7            v8             v9
##       -0.18421       0.56952        1.47990       -0.15238
##         v10           v11           v12            v13
##        0.68287       0.36623       -0.34411       -1.16890
##         v14           v15           v16            v17
##        1.80665       0.81441       -0.92097        0.36243
##         v18           v19           v20            v21
##       -1.60658       0.47324        1.45664       -0.22080
##         v22           v23           v24            v25
##        1.13222      -1.38827       -0.25138       -0.77154
##         v26           v27           v28            v29
##        0.18319       1.25683       -0.48505       -0.17716
##         v30           v31           v32            v33
##       -0.46940       0.82515        1.23515       -0.63079
##         v34           v35           v36            v37
##        1.27143       0.10427        0.57332        1.24418
##         v38           v39           v40            v41
##        0.37389      -0.07159        1.14420        0.32202
##         v42           v43           v44            v45
##        1.22765      -0.04396        0.64534        0.50554
##         v46           v47           v48            v49
##        1.71212       0.76634        0.90285        0.80982
##         v50           v51           v52            v53
##        1.17660       0.77539        1.87365        1.66285
##         v54           v55           v56            v57
##       -0.93098       0.65758       -0.46612       -0.23878
##         v58           v59           v60            v61
##        0.14970       0.48400        1.10058       -0.65693
##         v62           v63           v64            v65
##        0.50875      -0.47711        0.88757       -0.09152
##         v66           v67           v68            v69
##       -0.54107      -0.85478        0.87515        0.48031
```

```
##           v70           v71           v72           v73
##       0.65663       1.09573      -0.89919       0.27727
##           v74             q
##       0.07657      -1.32748
##
##
## [[3]]
##
## Fraction in 1st window = 0.1
## Fraction in 2nd window = 0.5
##
##           rho         alpha          beta         theta
##      -1.51844       1.31645       1.08968       1.11261
##       shurban       density     numchange       inv.gdp
##       0.20956      -0.64283      -0.62421      -1.19300
##           raw      manufact        govern       nogovern
##       0.60569       0.37773       1.16318       1.02252
##    sharetransf  sharehigheduc       patents       openexp
##       0.52327      -2.53705       1.25359       1.52443
##        openimp      w_shurban     w_density    w_numchange
##      -0.35535      -1.57987       1.07859      -0.01976
##      w_inv.gdp         w_raw     w_manufact      w_govern
##      -0.83546      -1.82092      -2.31610      -1.26815
##     w_nogovern  w_sharetransf w_sharehigheduc     w_patents
##      -2.45532       0.23585       0.60184       0.91344
##      w_openexp     w_openimp            s2            v1
##      -1.14565       1.91488       0.88871       0.35681
##            v2            v3            v4            v5
##      -0.06722       0.46105       1.15469       0.72795
##            v6            v7            v8            v9
##       0.54253       0.70018       1.44997      -0.77023
##           v10           v11           v12           v13
##       0.40213      -0.57771      -0.26860       0.58891
##           v14           v15           v16           v17
##       1.78421       0.70701      -1.70879      -0.21679
##           v18           v19           v20           v21
##      -0.62422       1.20034       1.06465      -0.54228
##           v22           v23           v24           v25
##       1.57692      -1.09922       1.06559      -0.33892
##           v26           v27           v28           v29
##       0.74182       0.52353      -0.55785      -0.04700
##           v30           v31           v32           v33
##      -1.09641       0.51450       0.47660      -0.70109
##           v34           v35           v36           v37
##       1.93505       1.30846       0.48429      -1.00275
##           v38           v39           v40           v41
##       0.39446      -0.93389       1.75586       0.47148
##           v42           v43           v44           v45
##       0.15008      -0.54446       0.72982       0.28989
##           v46           v47           v48           v49
##       0.86616       0.56987       0.58999       1.49394
##           v50           v51           v52           v53
##       1.22050       1.72919       2.70680       1.08866
##           v54           v55           v56           v57
```

```
##      -0.42278       1.09320      -1.00849      -0.51660
##         v58           v59           v60           v61
##       0.49540       0.66380       0.66293       0.26688
##         v62           v63           v64           v65
##       0.28043      -0.13627       0.11733       0.11590
##         v66           v67           v68           v69
##      -0.46063       1.09242       0.71542       0.47815
##         v70           v71           v72           v73
##       0.42416       1.02655      -1.44817       1.11175
##         v74            q
##       0.82630      -1.64926
```