# Example11-6

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## Example10-4(FDL)の First Difference version が今回。First Difference 取ってから lag とる。

```
load("~/計量経済学演習/R data sets for 5e/fertil3.RData")
fertil3<-data
library(dynlm);library(stargazer)

## Loading required package: zoo

##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric

##
## Please cite as:

## Hlavac, Marek (2018). stargazer: Well-Formatted Regression and Summary Statistics Tables.

## R package version 5.2.2. https://CRAN.R-project.org/package=stargazer
```

### Define Yearly time series beginning in 1913

```
tsdata <- ts(fertil3, start=1913)
```

### First Difference model

```
res1 <- dynlm( d(gfr) ~ d(pe), data=tsdata)
```

### Lagged First Difference model

```
res2 <- dynlm( d(gfr) ~ d(pe) + L(d(pe)) + L(d(pe),2), data=tsdata)

stargazer(res1,res2,type="text")

##
## ================================================================
##                                Dependent variable:
##                      -----------------------------------------
##                                     d(gfr)
##                          (1)                     (2)
```

```
## -----------------------------------------------------------
## d(pe)                         -0.043              -0.036
##                              (0.028)             (0.027)
##
## L(d(pe))                                          -0.014
##                                                  (0.028)
##
## L(d(pe), 2)                                     0.110***
##                                                  (0.027)
##
## Constant                      -0.785            -0.964**
##                              (0.502)             (0.468)
##
## -----------------------------------------------------------
## Observations                    71                  69
## R2                            0.032               0.232
## Adjusted R2                   0.018               0.197
## Residual Std. Error  4.221 (df = 69)      3.859 (df = 65)
## F Statistic         2.263 (df = 1; 69) 6.563*** (df = 3; 65)
## ===========================================================
## Note:                          *p<0.1; **p<0.05; ***p<0.01
```

pe(t-2)-pe(t-3)の term だけめっちゃ有意に出てる。change of tax code は二年後に一番影響でる。